THE SCHOOL YEAR 1932–33

The new school year is about to begin and the activities, pleasures, and experiences of vacation time will be but memories in a short while for teachers and students alike.

The objective which looms largest at the opening of school is to make the new year better than the last. To achieve this requires planning, preparation, and execution. Neither of these factors may be neglected nor forgotten.

The foundation for this improvement must be started on the very first school day. Any flaw or weakness which creeps into its construction, at this time, is bound to show up later.

To avoid trouble, then, it is imperative that the first day of school be a real school day. It must be a source of inspiration, strength, and enthusiasm to the student. It can be that only if the instructor is fully conscious of his duties and responsibilities.

There is still time to make adequate preparation for the first day of school in September. Now is the acceptable time. If the preparation is not made now, the best results for 1932–33 cannot be expected.

THE POSTERS

With this issue, the publishing of the posters for the school-shop bulletin board has been resumed. Make use of these teaching aids. Don't forget that these posters will help you to keep your bulletin board alive. Display one poster for two weeks and then the next one for two weeks. In this way, student interest in the bulletins will always remain fresh.

THIS MONTH'S COVER

The industrial-practice picture used for our cover picture this month shows an arc welder at work on the shell of a large pasteurizer.

Photo courtesy of the Lincoln Electric Company, Cleveland, Ohio.

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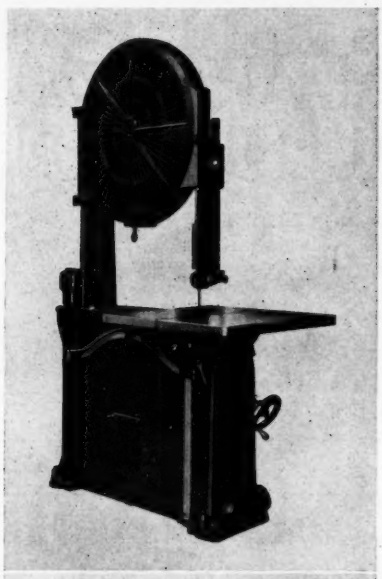
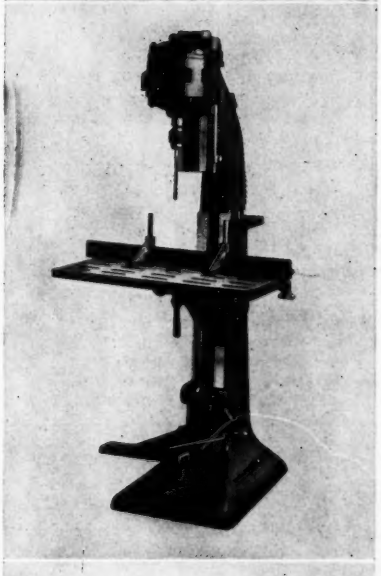
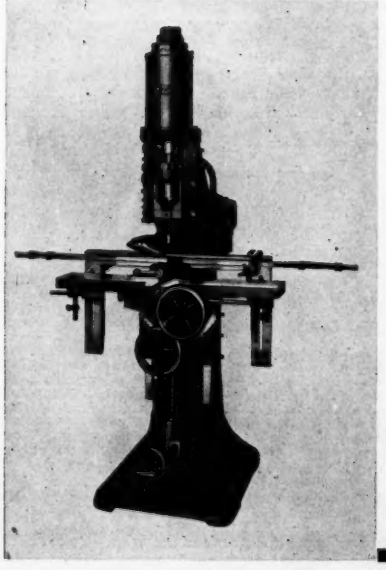






Only good tools will produce good work

ONLY with good tools—tools of the most modern design and construction—can the pupils of vocational and manual training schools learn to do good work. No amount of theorizing can counteract the retarding influence and the discouraging effect on the pupil resulting from poor craftsmanship, which frequently is directly attributable to poor tools.

The three Yates-American machines shown here are excellent examples of modern engineering. They typify the progress in woodworking machinery that has resulted from today's demand for speed, safety and reliability. They exemplify the modern tendency toward greater ease of operation and increased results per unit of effort. They are part of our fulfillment of the requirements of industry which we are pleased to contribute to the progress of vocational education.

Descriptive circulars of these machines will be gladly sent upon request

SEE OUR DATA IN BRUCE'S SCHOOL SHOP ANNUAL 33rd EDITION

YATES-AMERICAN

YATES-AMERICAN MACHINE COMPANY
VOCATIONAL DIVISION
BELOIT, WISCONSIN, U. S. A.

INDUSTRIAL ARTS and VOCATIONAL EDUCATION

VOLUME 21 SEPTEMBER, 1932 NUMBER 9

Vocational-School Administrators and Technological Changes in Industry

*S. Lewis Land**

TECHNOLOGICAL change is not new. Mechanization in industry dates back to the first Industrial Revolution in England. The rapid progress of science and invention and its effects upon mechanization in industry in recent years, particularly during the past two decades, have added certain complications which have caused widespread interest and which bring about particular problems for the vocational-school administrator. So rapid have been the changes in industry during recent years that perhaps about the only thing which we can count upon as constant and consistent is change.

Technological Change in Industry and Business

In the building industry the bureau of labor statistics tells us that one machine operator and a helper with a ditch-digging machine can do as much work in one hour as 44 men using hand shovels can do in the same time. They also estimate that a power shovel operated by one man will now dig and load as much dirt in one hour as 62 men with hand shovels could dig and load in the same time.

In the glass industry where previous to the past twenty years all glass tubes were made by skilled glass blowers, a machine which is now in use does the work of 600 skilled glass blowers.

In the field of transportation in New York City only a few years ago eleven men were required to operate one subway train with ten passenger cars. Now we find that through an automatic control system this gang of eleven men has been replaced by two men, a motorman and a guard.

In the commercial field the changes have been no less significant than in the other fields mentioned. All we need to do to get a cross section of what is happening in this field is to visit one of our national business shows. At the annual business show in New York last December there were exhibited among other labor-saving devices an interest calculating mechanism which with one operator does as much work as ten bank clerks; a teletyping machine which enables a stenographer to transmit a message from one city to another by a mere typing operation; and an electric bookkeeping machine which issues bills against debtors, writes ledger entries, and automatically balances books.

Many other similar examples from other fields of commerce and industry could be mentioned, but these are sufficient to indicate conclusively that there is rapid technological change.

Technological Unemployment

We shall not consider at any great length the factor of technological unemployment but it is so closely associated with the problem at hand, that of the new demands upon vocational-school administrators created by technological change, this factor cannot be passed over without some consideration. According to the United States department of commerce there has been a decline of workers in certain major branches of commerce and industry since 1920. We have, of course, accurate information from the 1920 census report concerning the number of people employed in all occupations. Unfortunately, the complete 1930 census report is not yet available. The department of commerce has, however, made available the number of people gainfully employed in the major divisions. A comparison of these two reports shows that during this ten-year period in the field of agriculture there was a decline of more than 470,000 workers.

Now, a fair question to ask is what became of those 470,000 people. From the facts previously given, it may be assumed that a large proportion of them were technologically displaced. In the same ten-year period, however, in which there was a decline in this occupational division there was an increase of about 7,000,000 in the three divisions of manufacturing, transportation, and trade. In other words, when the decrease is balanced against the increase, we have a surplus in these four major divisions of employment of 6,530,000 jobs.

*Educational Director, Heating and Piping Contractors National Association.

Technological unemployment, then, it seems is temporary rather than permanent.

There are important implications in these facts for the vocational-school administrator. Such a situation as this imposes upon him important and heavy responsibilities. We do not know whether this transfer of people from one job to another provides adequately for those who are displaced by the machine. We do know that over a period of the past decade working hours per day and working days per week have decreased in most of our industries. This adjustment provides for a portion of the technological displacement, but it likewise imposes upon the vocational-school administrator important responsibilities for providing adequately for the spare-time activities of workers. This whole problem of spare-time activities and the effect which technological change has upon it is a subject in itself and no attempt will be made here to treat it.

The Superannuated Mechanic and the Recruiting of New Workers

Aside from these problems brought about by technological change, there is a further problem of the recruiting into commerce and industry of the 2,000,000 boys and girls who become of working age each year and the new immigrants who join our labor forces each year.

Before we can adequately provide for the selection, training, and employment of these new recruits we must provide for the superannuated mechanic who in some of our industries is getting to be a problem. There comes a point in the life of every man engaged at manual labor when his usefulness from the standpoint of producing a full day's work decreases. For this group of men some provision should be made around the age of, perhaps, 60 or 65 in some industries — certainly not later than 70 in most industries. This provision, we believe, should be made by industry itself rather than by either the federal or state government.

Production versus Distribution

Technological change tends to lower production costs and to increase the amount of production. Lower production costs and increased amount of manufactured goods mean that we must have larger distribution if we are to keep the wheels of productive machinery turning. These facts have brought about a distinct change in the importance of the two fields of production and distribution. Previous to 1900 our problems in this country were largely of a production nature. We were primarily concerned with where and how we could get raw materials and how economically those raw materials could be converted into usable products. We were less concerned about the distribution of those products. Now the emphasis has entirely changed. Our problems of production, including source of raw material and its manufacture, are not so great. We have now in the storehouse and on the shelves of our manufacturers and wholesalers large supplies of manufactured goods. In other words, there is an overproduction in practically every field. This means that our problems of distribution, including finance, management, and merchandising, have been increased. The vocational-school administrator if he is to keep his training program in step with the trend of his times cannot overlook these facts.

We have taken a short excursion into a few branches of commerce and industry and have determined to some degree the nature and extent of technological change. At least we know that there is technological change. We have considered briefly the effect which technological change has upon employment, upon training programs for spare-time activities, upon recruiting of new workers, and upon the productive and distributive channels of commerce and trade. These are our problems. Let us turn now to the training programs which have been and are being created to meet them.

The Need for Adequate Data and Information

Perhaps the greatest hindrance to the organization of training programs to meet the needs created by technological change is the lack of adequate data and information concerning the problems to be met. It is hoped that some information and data of particular significance will result from the effort recently made by the United States department of labor. A national committee on technological employment created by the department of labor has given some careful thought and study to the problem and has recommended that eight specific studies be made by the various governmental departments and agencies under the general direction of the department of labor. It is interesting to note that in the fundamental point of view of the committee it "did not oppose progress in the use of labor-saving mechanisms and methods," that it "believes that their total effect is to promote social well being," and that it "regards the main problem before the country to be that of reaping the benefits of technological advance while at the same time protecting both the worker and society against the undesirable results that may as a by-product follow in its wake."

Technological Change in the Building Industry

As examples of training services created to meet technological changes in the building industry let us consider briefly two services of the Heating and Piping Contractors National Association, one in the field of production and the other in the field of distribution.

Previous to the past five years practically all of the piping for heating installations was installed by threaded connections. Over the period of the past five years there has been a very rapid increase in the use of welding in the installation of piping, particularly in heating establishments, power plants, installation of oil lines, and the like. The change was not gradual but came rather suddenly. Few of our 83,000 journeymen mechanics had any welding knowledge or skill. Those contractors who made welded installations were forced

to either "farm out" their welding work to specialists in the welding field or employ welding specialists. Either procedure worked to the disadvantage of both the contractor and his customer because frequently the workmanship was not well done and the cost to the consumer was always higher.

The national association, therefore, inaugurated an educational service to meet this technological change. This phase of the association's service may be broken down into three parts: First, it established certain standards for the installation of welded piping. Second, it prepared a *Standard Manual on Pipe Welding* which is used by journeyman mechanics as a manual of procedure, by contractors as a reference volume, by architects and engineers as a guide in their specification work, and by training agencies as basic text material. The third phase of the service involved the organization of training programs for journeymen mechanics. In the development of this phase of the service this association is coöperating with the already established public educational agencies responsible for this specialized task rather than setting up its own training agencies.

It also developed certain minimum standards for the organization and maintenance of the training programs which it is promoting with state and local vocational-school agencies. These standards provide that instruction shall be given first to journeymen fitters. In other words, the association believes that before instruction is made available to apprentices and those not already engaged in the trade, that immediate needs should be met. It holds also that not every journeyman should be trained in welding. Unfortunately, in the heating and piping industry no provision has been made for the superannuated journeymen and as a result there are some men approaching the ages of 65 and 70 who probably will never learn to be welders and no attempt should be made to train them as welders. There are others who are working in organizations where such a limited amount of welding is done and such a very small part of the time of the entire working force is in the field of welding that each man would not be able to keep in constant practice. In these cases, a limited number, possibly ranging from 10 per cent to 50 per cent of those employed by any one contractor, the number depending on the amount of welding he does, should be selected and trained as welders and that the contractor should use these journeymen fitters as welding specialists.

The standards provide further for adequate accommodations for classrooms and shops, for qualified instructors who are skilled both as welders and as instructors, and for an adequate course of study.

It is recognized in the presentation of this as an example of an educational service organized to meet a technological change that it is perhaps not typical since it involves the training of a mechanic in simply an added skill. Frequently it may be necessary to entirely retrain certain mechanics when the occupation in which they are engaged has become completely obsolete. Such a situation, of course, would offer greater difficulties than the one just outlined.

A Problem in the Distribution Field

Then, from the standpoint of an educational service in the field of distribution which is offered to meet demands created by technological changes, let us consider briefly another phase of this training program. Technological change in the heating industry during recent years has been very rapid. Air conditioning, welding, automatic heat control and many other factors have contributed to the problems brought about by these changes. The changes have been so rapid that it is difficult for the heating contractor to keep himself informed about new developments in every phase of the proper management of his business, particularly with reference to merchandising new materials which are constantly coming on the market. This natural trend consequently created the need for a training service in the selling field. To meet this need a merchandising service was organized, which gives the contractor certain specific merchandising materials and selling aids. To accomplish this, sales conferences or schools and a series of selling campaigns through local groups were organized.

Major Implications for the Vocational-School Administrator

Having explored the nature and extent of technological change and reviewed some of the services which have been created to meet such changes, let us turn now to a consideration of the implication of these changes to the vocational-school administrator. All will agree, that these changes contribute to making his work more important and at the same time more difficult.

The vocational-school administrator, if his job is to be done effectively, must keep step with change. It is just as important or more important for him to keep in close step with the rapidly changing conditions in business and industry as it is for those who are engaged in business and industry. In fact, a training service which is offered without the knowledge of complete facts concerning these changes may do more harm than good. The vocational-school administrator, if he does not know business and industry trends and the needs of industry today and tomorrow, may be directing persons into occupations and training them for occupations which do not exist or tomorrow will be obsolete. Such a procedure, of course, would be criminal from the standpoint of the injustice to the trainee, would be a disadvantage rather than an advantage to the employer, and from the standpoint of the public would be a waste of public funds.

Technological change makes it necessary that the vocational-school administrator keep in close touch with organized labor. This does not mean that organized labor should dominate his program, but he should

know the policies and action of organized labor on certain fundamental changes which occur from time to time. The program in welding to which reference has been made is a good example in this connection. In the early stages of the development of welding a separate welders' international union was organized and application was made to the American Federation of Labor for a charter which was refused. The welders' international union would have classified the welding mechanic as a welder as such, without regard to the trade or industry in which he would work. Such a procedure would be uneconomical and wasteful from the standpoint of the employer of labor as well as from the point of view of the public who in the final analysis must pay the bill. Encouragement on the part of the vocational-school administrator to that movement and the setting up of training programs for those in the organization would have been contributing to this wastefulness. The American Federation of Labor ruled that welding is simply a new tool to be included in the trade in which the process is used. Any vocational-training program which incorporates welding into its service must recognize this American Federation ruling. The vocational-school administrator, therefore, must be thoroughly familiar with labor trends.

On the basis of his findings through the maintenance of these close contacts with industry and with organized labor, he will plan his program always looking into the future as far as he can but making sure that those who are affected by the program are following him. No matter how well he may know the facts and no matter how sound the program which he has planned may be, it will be ineffective from the standpoint of getting results unless it has the complete backing of every interest.

A Summarized Statement

To sum up briefly, there is a definite tendency toward mechanization in industry. Technological change is increasing and probably will continue to increase. We have made no attempt to place technological development in the balance to determine its effects — good and evil. We have neither challenged nor confirmed the point of view of some philosophers that the machine dulls and deadens the moral and cultural fabric of our industrial life. There is, however, no cause for alarm in the trend toward technological development, provided vocational-school administrators accept the responsibilities which such technological change creates.

This article reviews briefly a few educational activities which have been created to meet technological change. It points out that there are four major implications in this technological development for the vocational-school administrator: First, he must keep step with change; second, he must maintain close contact with all branches of industry including organized labor; third, his training program must be carefully planned and must be based on factual information and on the training needs as they exist; and fourth, he must make sure that the program as planned receives the support of every interest involved in it so that it will be really effective in meeting the increasing new demands created by technological change.

Safety in the School Shop

*Armen S. Kurkjian**

ANY consideration of safety in the school shop must deal, first of all, with the individual responsible for the class. Every instructor must consider safety in every lesson he presents and in every action he takes in his work. In order that the instructor may have this attitude he must have had similar training somewhere in his experience. It is regrettable that this type of training is not always given in the shops of our normal colleges. One professor who was in charge of a woodworking shop boasted that he did not use guards himself and did not stress the matter with his students. His reason for assuming this attitude was that factory men, with whom he had talked, assured him that there were no guards on the market that were practical and that they caused more accidents than they prevented. This attitude does not seem justified in view of the fact that most of the larger industrial concerns in the United States employ "safety engineers." The efforts of these engineers are devoted to the task of inventing safety devices for every situation in the factory where there is a possibility of an accident occurring.

In addition to these efforts on the part of employers we find that important legislative measures have been adopted which have for their purpose the stimulation of employers and employees into the adoption of safety measures in our factories. These legislative acts should include our school shops which would throw upon the teachers the responsibility of making a special study of safety practices and safety guards for the purpose of conveying the most modern ideas on safety to his pupils.

Some effort has been made by some shop teachers to dodge their responsibility by having the parents of the children sign a formal request to the board of education to permit their children to operate the machines in the school shop. While this device may ease the teacher's conscience to some extent if an accident occurs in the

*Sales Manager, Oliver Machinery Co., Grand Rapids, Michigan.

school, the citizens are not concerned with who gave the boy permission to operate the machine. What is of interest to them is the fact that the boy has been maimed, and the maiming was done in the public school. As soon as they acquire the notion that it is possible for their boys to be injured in the school, the school is likely to suffer from their change of attitude. Unfortunately, too, the brunt of this blame falls upon the department in which the accident occurred.

Lighting, Housekeeping, Installation

When we consider the problem of safety one of the first things to be thought of is the illumination of the shop. To secure the proper illumination, the lights must be adequate both in size and number and they also must be placed in the most advantageous position for the workers.

Narrow, turning stairways should be avoided and all passageways and aisles should be wide enough to remove the possibility of accidents through rushing or crowding.

Then, too, the orderliness of the room has something to do with prevention of accidents.

All material used should be safely piled, shelved, or stacked in such a way that the boys can easily get at it. The aisles too, should always be kept clear of all parts in order that nothing be left to cause slipping or falling. Rubber mats used in the aisles have been found to be a great help for this purpose.

In the consideration of what mechanical equipment is best for use in the school shop it is wise to select the most direct-motor-driven types possible and to see to it that there are no more revolving units exposed than are absolutely necessary. By all means choose a machine so designed that a boy can start or stop it instantly without moving from his natural position while doing his work.

Safety guards of approved type should be installed on every machine and the instructor must train himself in their use. Then let him insist that the boys use them as directed. "Do as I do" should be the basis of his teaching rather than, "Do as I tell you to do."

Good behavior in the shop is absolutely necessary. The instructor must inculcate habits of orderliness and quiet attention to their own work on the part of his pupils. This is just as necessary, or even more so, in the shop as it is in a botany, history, or physics class.

Danger of Overspeeding

Every machine containing rapidly revolving elements, such as a jointer, saw, grinding wheel, or shaper, is designed to run within certain safe speed limits expressed in revolutions per minute, commonly called r.p.m. These limits must not be exceeded because the force which tends to cause the saw or grinding wheel to burst increases as the square of the revolutions per minute. In other words, doubling the speed causes four times the internal strain and consequent danger. To increase the speed of a shaper from 3600 to 7200 revolutions per minute is a serious matter because the centrifugal force is not doubled but quadrupled. When run at this speed, cutters must be in perfect balance. Lack of balance causes vibration and a dangerous strain on the revolving head. This same law should also be borne in mind when turning work upon a lathe or in mounting and operating a grinding wheel.

Special Cautions on Machines

Circular Saws. Choose the proper saw for the kind of work to be done. Use a crosscut saw for crosscutting and a ripsaw for ripping, combination saws, so called, are intended to be used on light finish work. If used on general work they will burn and cup.

The greatest safeguard for any circular saw is the splitter which prevents the work from closing up at the back of the saw. The hood over the saw should be automatic in action and not dependent on the judgment or whim of the operator. By all means keep circular saws sharp. On a dull saw the teeth act as hooks instead of cutting and thus cause small cracks at the bottom of the teeth which in time cause breakage. As stated above, a saw must be run at the speed for which it is intended. When ordering a saw be sure to give the speed of the arbor. The manufacturer will then furnish one properly tensioned for that speed. A saw properly tensioned for a speed of 1800 r.p.m. when run at 3600 r.p.m. will cup because of the overstrain.

Band Saw. A band-saw wheel covering will not last forever as some instructors seem to think. The rubber tires must be watched and kept free from grooves or knobs. When they are too badly worn to be kept smooth with sandpaper applied on a hardwood block, they must be replaced. When mounting the saw do not put too much tension upon it. Use no more than necessary to track it on the wheel. Too much strain may cause a break. Use a thin saw on a small diameter wheel (a 26 gauge for an 18-inch wheel) because of the sharp bending action. The blade itself should be guarded so that the only exposed portion is that passing through the stock and a very small portion above the stock and below the upper guide. The upper and lower wheels should be entirely inclosed both in the rear and in front and around the periphery. If you have an old-style saw, see to it that proper guards are installed.

When operating the saw, use the right width of blade for the kind of work being done. Sharp curves and thin stock require a narrow blade. On thick work with long sweeps use a wide blade, even as wide as 1 inch. Forcing an average ½-inch blade around sharp curves may cause heat, crystallization, and consequent breakage. Never continue cutting nor try to pull work out of the saw after the current is shut off. Keep the saw sharp and examine the blade with a magnifying glass from time to time to see if minute cracks are forming at the roots of the teeth.

Jointers and Surface Planers. The revolving parts and knives on jointers and surface planers should be

completely covered. A jointer cutter should have two guards, one in front of the fence and one back of it, both automatic in action. The knives must be balanced against each other both by weight and measurement and be securely bolted to the head by special bolts. Never run a machine just received from the factory without first going over the bolts to make sure that the knives are fastened tightly. Inspect the bolts every week for security. Keep the knives sharp so that they will have a cutting and not a pounding action.

Tool Grinders. Use a grinding wheel heavy enough for the kind of work to be done. Do not use a light, thin wheel for heavy work and do not use a larger diameter wheel nor higher speed than the maker recommends. High-speed wheels should be covered except where the work is in contact with the wheel. Use revolving oilstone grinders for woodworking tools.

Wood-Turning Lathes. The lathe with the self-contained headstock without belts and pulleys is the safest to use. Remember that the strain on the revolving piece increases as the square of the speed. Fit the speed to the diameter of work being turned. On a small diameter use the higher speed. Never attempt to reach over a revolving part, your sleeve may be caught and a broken arm result. Keep the tools sharp so that the work will not be pried off the lathe.

Summary

To summarize we may say that there are five chief hazards in the use of edge tools on woodworking machines. These are the following:

1. Improper choice of cutting tool.
2. Inadequate or improper mounting of cutting tools.
3. Use of wrong operating speed for the particular cutting tool and lack of proper safety guards.
4. Lack of balance of revolving parts or tools.
5. Use of dull tools.

Accidents can be very materially decreased definitely guarding against these five hazards. The wide variety of work attempted in school shops with comparatively few machines tempts both instructors and pupils to take chances which may end in trouble. Therefore it is doubly necessary for an instructor in a school shop to study these five hazards and plan to overcome them. For the sake of clearness the hazards and remedies are here set down in parallel columns:

Causes	*Remedies*
1. Improper choice of cutting tools.	1. Choose tool properly for work in hand.
2. Inadequate or improper mounting of cutting tools.	2. Mount tools according to maker's directions as to speed and method of fastening.
3. Use of wrong operating speed and lack of proper safety guards.	3. Guard revolving parts and operate tools at recommended speeds.
4. Lack of balance of revolving parts or tools.	4. Balance knives by measurement and weight. Inspect weekly for security.
5. Use of dull tools.	5. Inspect frequently for sharpness and sharpen as often as necessary.

A System for Recording Progress of Pupils in a Trade School

*J. W. Fleming**

ANY system for recording the progress of a pupil should possess the following features:

1. The form or forms on which the progress is recorded should be so designed that they may be read and interpreted easily, and that the information posted thereon be complete.

2. The system for recording the pupils' progress should be well organized and the clerical work on the part of the teacher be reduced to a minimum.

The system described in this article is a composite of many forms and systems used in various schools throughout the country, and is the outgrowth of a study made several years ago to develop something for properly recording the progress of pupils in trade schools. Its organization embodies the following:

1. An analysis of the subject or trade using the unit plan of organization for the course outline.

2. A record of the analysis in proper teaching sequence, or natural order of performance.

3. An evaluation of the units and subdivisions of the course outline. These units and subdivisions are given numerical values based on the assumption that the shop course is worth 100 per cent. To determine the relative value for each unit and subdivision, two factors are given consideration:

a) The relative value of the unit in industry.

b) The relative amount of time devoted to the unit in the school shop.

4. A form for the shop on which this information is recorded and a place to record the work completed by the pupil. This is shown in Figure 1 and is based on principles and operations.

5. A form for the shop on which the work completed by the pupil is recorded. This is based on individual jobs and is shown in Figure 2.

*Vice-principal, C. B. Connelley Trade School, Pittsburgh, Pennsylvania.

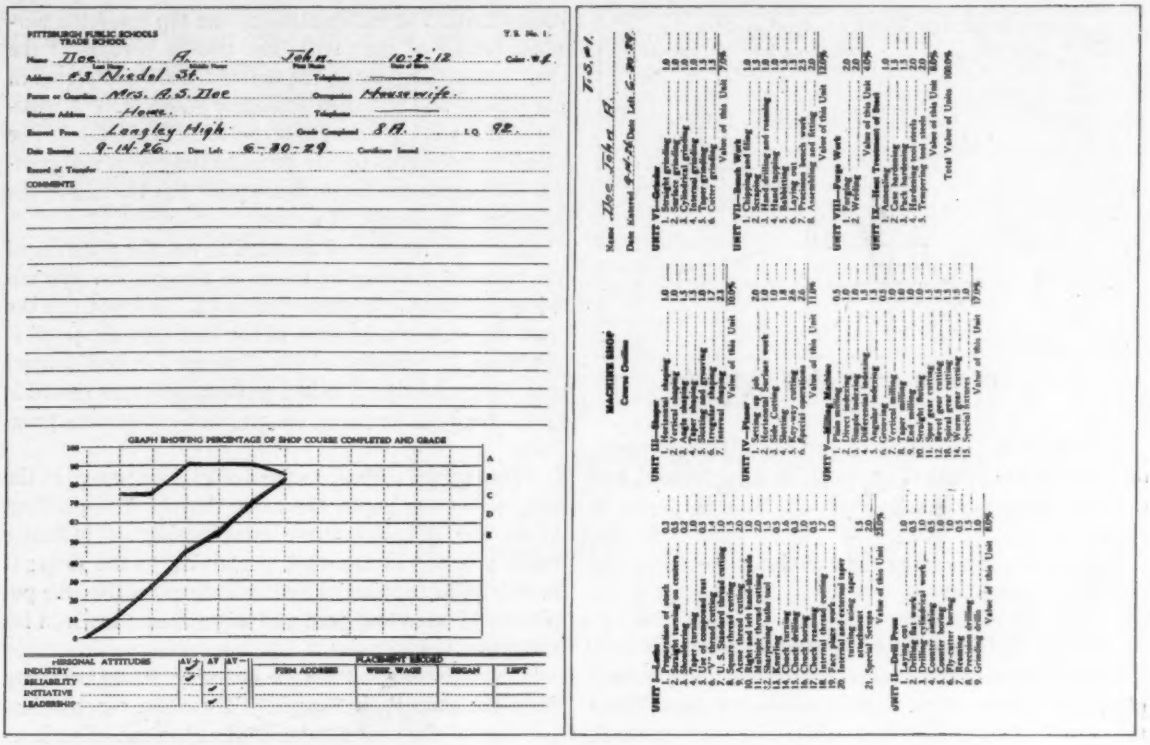


FIG. 1. FACE OF FORM AT RIGHT AND REVERSE AT LEFT.
ORIGINAL SIZE OF FORM 8½ BY 11 IN.

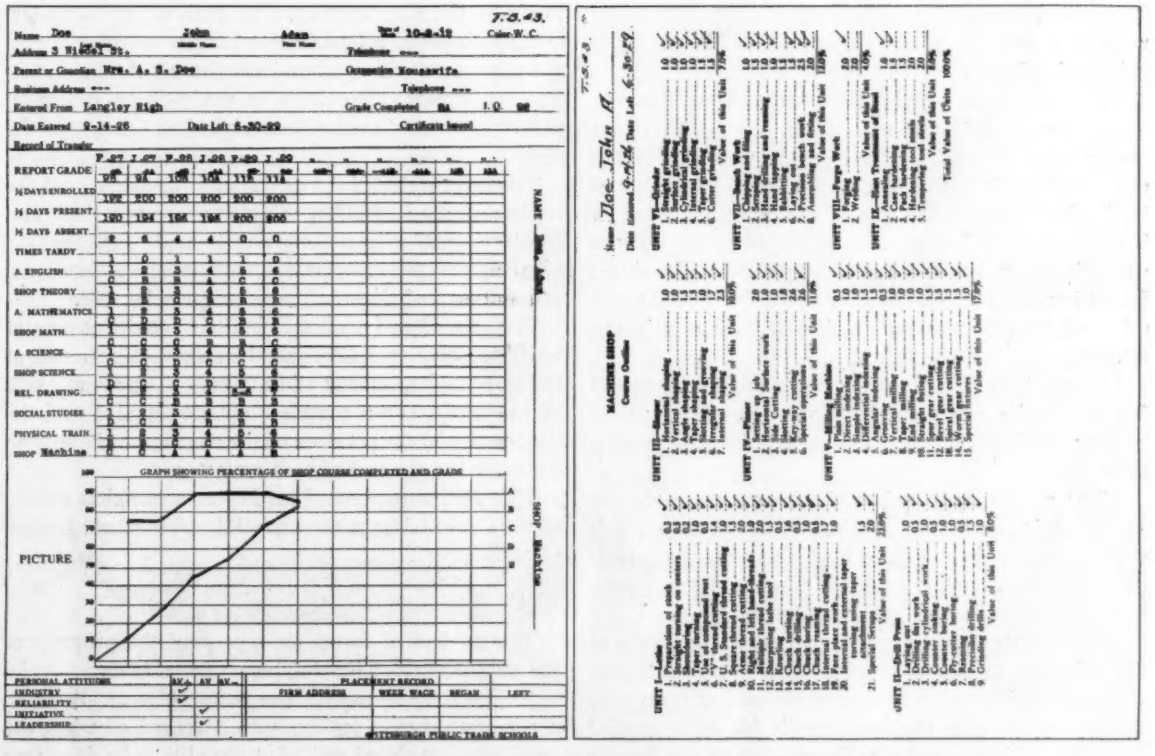
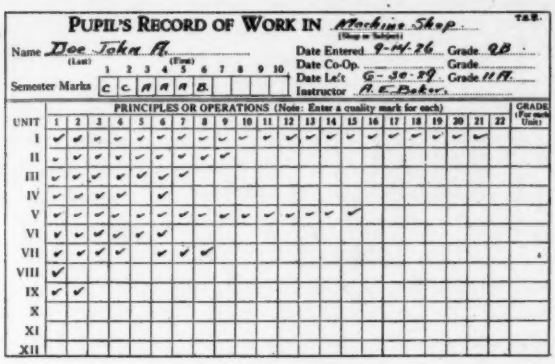


FIG. 3. FACE OF FORM AT RIGHT AND REVERSE AT LEFT.
ORIGINAL SIZE OF FORM 8½ BY 11 IN.



PUPIL'S RECORD OF WORK IN Machine Shop

Name Doe John A. (Last) (First)

Date Entered 9-14-26 Grade 9B

Date Co-Op. Grade

Date Left 6-30-29 Grade 11A

Semester Marks 1 C 2 C 3 A 4 A 5 B 6 7 8 9 10

Instructor A. E. Baker

UNIT	PRINCIPLES OR OPERATIONS (Note: Enter a quality mark for each) 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	GRADE (For each Unit)
I	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
II	✓	✓	✓	✓	✓	✓	✓	✓															
III	✓	✓	✓	✓	✓	✓																	
IV	✓	✓	✓	✓		✓																	
V	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓								
VI	✓	✓	✓	✓	✓	✓																	
VII	✓	✓	✓	✓		✓	✓	✓															
VIII	✓																						
IX	✓	✓																					
X																							
XI																							
XII																							

FIG. 2. FULL SIZE OF THIS CARD IS 5 BY 8 IN.

6. A form for the office (a permanent record card) on which the progress of the pupil in shop, related, and so-called academic work is posted. This is shown in Figure 3.

7. Organization of the personnel for recording the pupils' progress.

Description of Forms Used

The form shown in Figure 1 lists the units, principles, and operations with their per-cent values. When the pupil has completed a principle or operation, credit is given on this form. This record shows the instructor and the pupil what principles or operations have been completed and what is next in order.

The reverse side of this form is ruled as shown for recording the per cent of work completed in graph form, known as the quantity curve. The quality of work is shown by a curve using the A, B, C, D, E points of value.

These curves are plotted at the end of each 20 weeks, i.e., at the end of the semester. The lower curve shows the quantity of work completed; the upper curve the quality of work completed. The progress of the pupil is clearly shown by the rise of the quantity curve. If it rises rapidly it indicates rapid progress. If it flattens out it indicates little or no progress, and is the signal for an investigation on the part of the vocational counselor, adviser, dean, or other officials interested in pupil progress.

Figure 2 is used in those shops that require a record for each and every individual job completed, such as in the electric-wiring department, the drafting department, etc.

When a sufficient number of jobs are completed to justify giving credit for a principle or operation, it is checked on the form Figure 1 which shows the principles and operations completed, whereas form Figure 2 shows the individual jobs completed.

When course outlines are organized on the basis of the principles or operations involved, it makes it possible for the instructor to change his project from time to time and to give the pupil credit for doing special jobs, etc., without changing his per-cent values for the various units of work.

Form Figure 3 is used in the office as a permanent record card. The information at the top gives the personal record of the pupil. The middle portion of the card is used for posting the units of work completed in his related and so-called academic subjects. The quality of this work is rated in terms of A, B, C, D, E. The attendance records should be accurately kept and posted. All records on this form are posted at the end of the semester, i.e., every 20 weeks.

The lower portion of the card shows the progress of the pupil in the shop by means of two graphs. The upper graph shows the quality of work, the lower one the quantity of work. In view of the fact that the pupil is spending 50 per cent of his time in this one subject and shop, and that this is a trade school, this record is given emphasis by using the graphs for recording progress.

These curves show the school official interested in the progress of the pupils the cases that need counseling. When the quantity curve rises rapidly it indicates rapid progress in the work pertaining to the shop; if the curve flattens out or makes little or no rise, the pupil should be interviewed and adjustments made in his training.

The values for plotting the quantity curves are taken from the shop form Figure 1. These are expressed as per cent of the course completed at the end of each semester, i.e., every 20 weeks.

A place is provided for a picture of the pupil at the lower left portion of the card. These pictures have been found extremely valuable for identification purposes.

At the bottom of the card a personality rating is made by the shop instructor in terms of average plus, average, average minus. These ratings are of value to the placement officer when interviewing the boy seeking employment. Provision is made for a follow-up placement record at the lower right-hand corner of the card.

The reverse side of the card shows the analysis of the trade expressed in units, principles, or operations and their per-cent values. Provision is made for checking off the principle or operation completed so that a detailed record of shopwork finished may be noted.

The related and academic work is noted in terms of units and quality grade, and the shopwork in terms of the two graphs, quality and quantity. The reverse side of the card gives a complete detailed analysis of the shopwork and the portions of the course that have been completed at the end of each semester.

This permanent record card gives a complete record of the students' progress from date of entrance to date of withdrawal.

Summary

This system of forms for recording the progress of the pupil has the following points in its favor:

1. The shop instructor has before him at all times, a complete course outline with a record of what the pupil has completed and what has still to be done (see Fig. 1).

2. The amount of clerical work on the part of the

instructor has been reduced to a minimum. This is extremely important as the facilities for doing clerical work in the average shop are limited.

3. Expressing the quantity of work completed in graph form shows much more clearly the progress of the pupil, than a series of figures stating that John Jones finished six jobs this semester and seven jobs the second semester, etc. Comparisons can be more quickly and easily made with the graph than with a series of figures.

4. The office form Figure 3 is a complete record of pupils' progress. Items dealing with the personal history of the pupil are clearly noted. The attendance record, the progress in related work, academic work and shopwork, can be easily read and interpreted. The detailed outline of the shop course is of greatest value to the office when making recommendations for later placements.

5. Form Figure 3 also offers valuable assistance to the office personnel when adjusting problems of discipline, problems of failure, and keeping parents informed of the pupil's progress.

Chalk-Plate Engraving for the School Printshop

*R. Randolph Karch**

OLD-TIME printers well remember when most newspaper illustrations and cartoons were made by "chalk-plate engraving," a nonchemical engraving process. It is said to be an uncontroverted fact that the majority of the best illustrators of today won their reputation on chalk plates.

The *Harding Bee Hive,* official paper of Harding Junior High School, Steubenville, Ohio, is practicing this ancient art, and has found it economical, satisfactory, and educational. The advantages of chalk-plate engraving, in a few words, could be enumerated as follows:

1. Cheapest method of making cuts.
2. Cuts quickly produced.
3. The method of production is very simple.
4. The engraving is not done in reverse but just as it will appear on the printed page.

Needed Equipment

The Harding plant was already equipped with a melting furnace and a stereotype casting box. All that was needed were the necessary plates, the gravures, and the student artists. Where stereotype equipment is not a part of the equipment, the casting can be done at the local newspaper office. Usually newspaper men are glad to coöperate with the schools.

The Process

The Plates. A steel plate is procurable, with a smooth, polished surface which is coated with a white,

FIG. 1. A CHALK-PLATE GRAVURE

heatproof and friable composition. These plates may be had in various sizes, to suit the needs and wants of the purchaser, and to fit the operator's casting box.

The Gravures, or "steel pencils," are used to cut through the composition on the chalk plates. The design is usually sketched lightly on the surface of the chalk, and then cut down to the plate after the correct lines are determined. It is advisable to cut the lines in more than one stroke. Upon the second stroke the steel surface will be reached without the gravures feeling any resistance from the composition. A gravure is shown in Figure 1.

FIG. 2. CHALK PLATE IN CASTING BOX

The Engraving. The picture is not drawn on the chalk plate as in linoleum work (in reverse), but is drawn direct, *just as it will appear when printed.* The drawing can be traced from the original, or it can be done free-hand. The composition of the coating allows the artist the most intricate hair lines and cross hatchings, almost impossible in linoleum-block cutting. The composition can be easily scraped down with a straight-edge or brass rule for very fine work. For printing on a soft packing on soft stock, it is advisable to have the full ⅛ inch of composition on the plate, so that routing out the high portions of the cast plate later will be unnecessary.

There are great possibilities in the use of a pantograph, with a gravure attached on the "drawing" end.

*Supervisor of Printing, Steubenville, Ohio.

Enlargements and reductions can thus be made to any practical scale.

Any number of plates can be made on one large plate, and each one stereotyped separately. Stereotyping does not injure the plate in any way, and any number of casts can be made from one plate.

If errors are made, they may be routed from the cast plate later. Hence there is almost no spoiled work.

As it is necessary for the artist to watch his work closely, a small rubber bulb is usually used to blow all

FIG. 3. CASTING BOX CLOSED, READY FOR POURING CAST

waste particles of chalk away so that they will not handicap the worker.

Stereotyping. The secret of successfully cast chalk plates lies in the uniformity of heat of all three elements — the chalk plate, the stereotype metal, and the casting box. Also, it is very necessary that the metal be heated to a much higher temperature than is used for casting paper matrices.

Uniike paper matrices, it is impossible to "burn up" the matrix with metal that is overheated.

In the casting process, the chalk plate serves as the matrix, or "mold," and is placed in the casting box as shown in Figure 2. The bars are placed in, and the box is closed, as shown in Figure 3. The stereotype metal is now poured into the box.

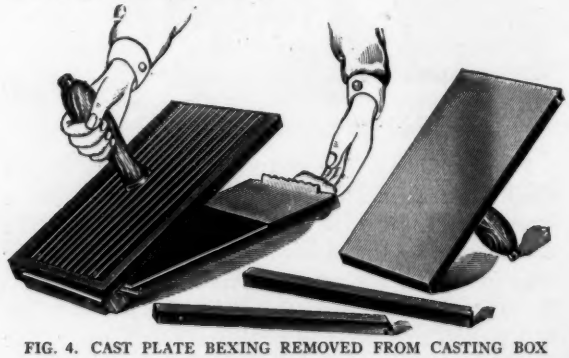


FIG. 4. CAST PLATE BEXING REMOVED FROM CASTING BOX

The stereotype metal, during the pouring, runs into each little cut on the plate. After cooling, the chalk plate is separated from the stereotype cast, as shown in Figure 4. "Type high" or "shell casts" can be made, depending upon the construction of the casting box used. The plate is now ready for printing.

If a large stereotype casting box is used, of the type

FIG. 5. HALFTONE OF AN ENGRAVED CHALK PLATE. (From Hackleman's "Commercial Engraving and Printing.")

supported on trunnions, it will be inconvenient to heat it to the necessary degree. One way to offset this handicap is to use two sheets of strawboard, laying them against the two faces of the box. When they are heated as well as possible, the plate and gauge bars are laid between the two sheets. The metal, not coming into contact with the casting box proper, is not cooled, and a better plate is cast. If this is done, the engraved plate must be heated, either by floating it in the metal itself with a wire sling, or heated over a flatiron placed over a gas flame. To hold the plate itself over the gas flame may warp it and render it useless.

If ordinary paper matrix gauge bars are used in casting chalk plates, a frame of strawboard, the thickness

FIG. 6. REPRODUCTION OF A PRINT FROM A CAST MADE FROM THE PLATE SHOWN IN FIG. 5

of the plate, should be cut and laid around the engraved plate. The gauge bars then rest partially on the steel plate and the strawboard.

A good grade of stereotype metal should be used. It is inexpensive and can be used over and over again, as old plates are melted up. The heat of the metal can be tested for the right temperature by thrusting a piece of paper into it. If the paper is scorched a good, dark

FIGS. 7 & 8. CHALK-PLATE ENGRAVINGS

brown, the metal is ready for pouring. Cold metal is readily recognized by the rounded, shiny lines on the plate. Metal too hot has a pitted appearance. If the

bars are cool, the metal will not run out through small crevices at the joints when pouring.

A chalk plate, engraved, is shown in Figure 5. Figure 6 illustrates the print of the cast from the chalk plate shown in Figure 5.

Cost. The total cost of the picture, appearing in Figure 7, the size used to illustrate features in a small school paper, is 20 cents. Another possibility of art-work with chalk plates is shown in Figure 8.

Chalk plates are easy to make, and boys have no difficulties in making them. Possibilities of a correlation between printing department and art department is easily seen.

Cuts courtesy of Commercial Engraving Publishing Co., Indianapolis, Ind., and Hoke Engraving Plate Co., Saint Louis, Mo.

Boy-Built Projects

*P. L. Cressman**

MR. R. O. SMALL, Deputy Commissioner of Education, Boston, Mass., tells the story of how he helped his son build a hut once upon a time.

The story runs something like this: Mr. Small's son, Maxwell, had collected odd boards, boxes, etc., and proceeded, in boy fashion, to build a hut in their own back yard. Evidently the hut was being built according to boy architectural plans which usually represents a fairly big idea, limited however by the materials on hand or readily available.

The hut was built in an attractive yard, in fact, a veritable rose garden. Their neighbors also had attractive gardens.

All seemed to be going quite well until Mr. Small came home at the close of a day's work. Mrs. Small reported the work, that a group of boys, including their son, had wrought in the back yard. Both Father and Mother were proud of the industry and ingenuity and coöperativeness these boys had manifested. They were not so certain as to the artistic and harmonious effects that this new hut added to the rose garden.

After much thought and discussion on the subject, giving due consideration to their son's interests, his boy friends, their rose garden, and also their neighbor's interest in the general appearance of all the rose gardens, they concluded that Mr. Small should take a half-day holiday, order some nicely matched lumber, and help their son build an attractive hut.

On the succeeding afternoon, father and son proceeded to build this new hut. A few new tools were added to the kit used by the boys on the previous day; they were a plum bob, a square, and a spirit level. Much interest was manifested by both father and son in the beginning of this new project. By 3 p.m. the boy's interest lagged a bit. This hut was too plumb. The boards were too square. At 4 p.m. the boy walked away on some pretense and father continued and completed a good-looking hut worthy of a place in a garden. At 5 p.m. Mr. Small became worried. His son had not been seen for an hour. He started to search for him and knowing boyish haunts he readily discovered his son with other boys across a meadow in a little woodland about a half mile from his home. There the boys were, building a hut according to their own ideals and notions.

Mr. Small says, "And there to save the appearance of our yard and maintain the good will of our neighbors, we drove our son a half mile from home to build his hut."

Satisfaction in the Making, Not in the Having

Many lessons can be drawn from this story. In fact, more than the space for this article will permit. It should be remembered that boys have interests and ideas of their own, and that all too frequently teachers impose on their boys, in the shops, an adult point of view even to the breaking point.

It may also be noted that the greatest amount of satisfaction is realized by the boy in the *making* of the hut or whatever he happens to be building and not in the *having*. The author of this article observed a group of boys, ages nine and ten, build seven different huts this summer. At no time was the hut considered completed by the boys for more than a day, before plans were laid for changing and improving the same.

Are not adults somewhat the same way? Who has not built a house and said, "If I had to do it again, I'd have it built this way," pointing out some improvements. Adults also get most satisfaction out of *the building, the doing, the acquiring*, and not in *the having*. As Henry Ford says, "There is more satisfaction in acquiring wealth, than in possessing it."

Teachers of industrial-arts work will do well to keep this in mind. Many teachers have acknowledged this fact in the exhibitions they stage. Instead of the projects on exhibition in the gymnasium or store window, at the end of the year, they are inviting patrons to see the boys at work in the shop or conduct the regular day classes in the evening and have an "open house" for visitors. Here parents have noted the real interest boys manifest in doing things.

A Few Factors in the Selection of Projects

A few of the factors to be borne in mind in the selection of projects are stated here:

1. *They must challenge a boy's interest.* Interest is one of the paramount factors in the educational process. Of course, most boys like to work with tools. That is one reason why teachers should attempt to do a minimum of lecture work in an industrial-arts shop. Ten minutes should be the limit. Boys want to build and

*Assistant Director Vocational Education, Department of Public Instruction, Harrisburg, Pennsylvania.

make things, and they want to make things that are of interest to them. A rigid set of exercises or set of projects offering no selections on the part of the boy is no longer the practice in modern school industrial-arts shops. This does not mean that a boy should be permitted to make anything he wishes to make as his first project. However, the best shop teachers do not tell the boys "No, you dare not make that." Sometimes they say "Sure, you dare make it. But let us see what is involved. You make a sketch of that project and list all the material," etc. By the time the boy has thought through the project he realizes that the particular project he had in mind had better be considered at a later date. The better teachers prepare a list of projects involving the teaching points they have in mind and allow a boy to select from this list the one they are most interested in building or better yet allow a boy to substitute a project of his own that can be made a means to an end in putting these teaching points over.

2. *They must be considered useful by the boy.* The teacher's or parent's idea of what is useful does not always have the same forceful appeal to the boy. He should feel that it is useful from his point of view. He will have a greater interest in building it if he regards it as useful. This fact is so generally accepted today that further comment is unnecessary.

3. *It should challenge a lad to put forth his best efforts.* In recent years, our attention has been called to the individual differences of pupil's abilities. However, even the Psalmist knew of this when he wrote in the First Psalm, "Who bringeth forth his fruit in his season."

We need to establish standards of attainment in our various units of industrial-arts work. These standards, however, need to be sufficiently flexible to provide for these differences in abilities.

Courses are sometimes outlined to meet the needs for the group of students possessing medium ability. This will mean that some students are required to work toward a standard beyond their ability, which will have a discouraging effect on them, while others slide along easily and with little effort because they possess ability above the average. When students, possessing superior ability, are permitted to work toward standards below their ability of attainment, they too are not receiving full value and in fact sometimes develop harmful tendencies.

The shop teacher should be the judge in this matter. He should see to it that the project will challenge the lad to put forth his best efforts in the completion of it. This will necessitate varying degrees of difficulty in the design and construction of our projects so as to fit the varying abilities of pupils.

4. *They should inherently require skill.* We are indebted to Professor S. L. Coover, of the State Teachers College at California, Pa., for this statement. The project may be large and yet require little or no skill in the construction of the same. Each project should be a challenge in the attainment of new and increasingly difficult skills.

The Experimental Projects

Industrial-arts shop teachers would do well to give consideration to projects of an experimental nature. This certainly would fit into "boy's psychology." Possibly the science department can teach us a few things along this line.

A boy 13 years of age moved from one city to another. He was enrolled in a new junior high school. In the industrial-arts department he was assigned to the electrical-bell-wiring shop. The boy turned to another boy standing near by and was heard to say in a low whisper, "My——, more bell wiring." He had received already one full semester of almost every conceivable bell hook-up, in the school in an adjoining city. Of course, this was a shock to his teacher. But this wise teacher changed his course. He now has a simple experiment on magnetism. In fact, he has attempted to reduce to a miniature or experimental basis all the larger electrical motors, machines, and appliances. He now has a simple *extensive* course for his boys in electricity rather than an *intensive* course.

Better Boy Projects

Industrial-arts instructors have made remarkable progress since 1876, the Centennial, and the days of the tool exercises. The better teachers have been constantly looking for new and improved projects.

They are almost unanimous in stating that we are in need of many more and better boy-built projects for our industrial-arts work. The INDUSTRIAL ARTS AND VOCATIONAL EDUCATION MAGAZINE and other magazines have made real contributions along this line but much more remains to be done.

How can we find more of the right kind of boy projects? "The best study of mankind is man," and so we might as well study the boy and boy's interests for the solution. What do your boys do in their spare time?

Do they have a place for a workbench at home? Does the wagon, sled, lawn mower, bicycle, etc., need repair? Do they go camping and what are their needs there? Do they have electric trains and do they feel the need for adding equipment to this set? Do they have a camera and do they know how to take a picture efficiently? Have they learned to take care of the family car? Do they need baseball bats or playground equipment? Do they like to make projects that move, as sleds, wagons, model airplanes, or miniature elevators?

The answer to this problem will be found in a study of the boy's interests and needs in every wise teacher's shop. Having discovered these boy projects, tell other teachers about them through the magazines.

Junior Mechanics Club Work

Better boy-built projects also are planned for in Junior Mechanics Club work. The standards suggested in this article also are included in the completion standards for the various units of work in Junior Mechanics. An article outlining this program appeared in the March and April, 1932, issues of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION MAGAZINE.

System as the First Machine-Shop Project

*A. M. Blakesley**

SYSTEMATIC arrangement and procedure are the keynotes of industrial practice, and the writer believes that the chord should be struck immediately upon introducing the student to any trade subject.

FIG. 1 AND 3 SHOW COMPLETE DRILL UNITS; FIG. 2. LATHE TOOL PANEL, NOTE CHUCKS ON SHELF

Proper arrangement of tools and machines, provide excellent opportunities for the injection of labor and timesaving methods. These are used in actual practice, and serve also to develop in the pupil a sense of organization. An in-coming student forms many impressions of the shop which invariably affect his attitude toward the vocation he has chosen. It is therefore essential that he be received into an orderly and systematic atmosphere. The very first lecture should be devoted to organization appreciation, and this should be followed by a tour of inspection through the shop, during which the instructor has an opportunity to point out and illustrate the importance and effect of efficient arrangement.

In some school shops the toolroom serves well as an object lesson in presenting the subject of system to the class. However, when there are small vocational groups of twelve or under, the toolroom plan may be discarded in favor of a ***unit*** or ***location*** scheme. Panels, located on or near each machine or bench, and containing the tools common to that particular machine or bench, have been found quite successful. Location of these panels in such a unit arrangement tends to increase the productive capacity of the learner because of the quick and easy access to auxiliary tools. The unit arrangement also localizes the movements of the operator thus eliminating the too frequent pilgrimages to the toolroom. Precision instruments and miscellaneous supplies may be kept by the instructor and issued on request. A boy appointed as shop foreman should check each unit before dismissal and note any missing equipment. To facilitate this checking, each tool should be silhouetted on the panel.

Systematic procedure is another phase of the industrial scheme which should be initiated in the school shop. Actual imitation of job procedure in commercial shops is not altogether practical but, a general plan whereby a student approaches, analyzes, and produces the assigned project is recommended. The following is a brief outline of the routine which has been adopted in the writer's shop. The approach takes place in the lecture room, the analysis is made by the student upon receiving the assignment, and subsequent production follows. Process sheets issued after each lecture, are kept by the pupil in his notebook. When he receives an assignment the student refers to that process sheet which explains the particular operation called for in the problem. Information sheets are kept on file in the shop to which he also may refer. After a careful analysis the boy is ready to fill out a job form as shown, noting the stock, machines, and tools he will use. A sketch of the project is also required on this form if a blue print is not available.

EDDYSTONE VOCATIONAL SCHOOL
JOB SHEET

Name ..... Grade .....Trade .....
Job No. ..... Dated .....Finished .....
Total Hrs. .....

Description of Job

Materials Used	
Machines	
Finished	
Trade Step	

Rating .....Remarks ..... Approved.....

JOB. FORM. ORIGINAL FORM 8½ BY 11 IN.

Having acquired considerable information relative to the assignment, the student presents the job form to the instructor for approval and then proceeds with his work. The extra time spent in these preparatory steps, proves of immeasurable value in training mechanics to *study the problem* before attempting to turn out the project.

*Eddystone Vocational School, Eddystone, Pennsylvania.

INDUSTRIAL ARTS and VOCATIONAL EDUCATION

J. J. METZ, Editor

THEY HAVE EYES, BUT THEY SEE NOT

Times of trials and troubles are never welcome. If man could but estimate the true worth of these periods, even depressions would be welcome. It is true, the present trials have sorely afflicted the entire world; nevertheless, they have also helped the world to see things from the viewpoint of sanity and common sense. Just as the war demonstrated to many young Americans how exceedingly little was required to carry on life, so this depression has brought the entire country back to first principles. It was not easy for the soldiers to be reduced to a state of mere existence under abnormal conditions, and it was not easy for the world to learn the bitter lesson that the artificial standards set up during times of prosperity were not, after all, the things that really mattered. Jobs, which in the past had become necessary evils, a means to an end; something which could be treated more or less with contempt, because there were always others to be had; suddenly became very desirable objects. With money getting scarcer, America once more learned what it meant to lead the simple life. Commercialized entertainment lost some of its prestige and glamour and many again found time for reading and study, the value of the natural beauties found near at home, and the art of entertaining oneself.

Then there also developed thousands of opportunities for helping those less fortunate and thus learning by experience the truth of the saying, "It is better to give than to receive." Really, hard as it is at present, there are many advantages which the present privations have brought along, could we but see them.

There is another phase to this which is of especial interest to the shop teacher, and that is the increased interest which many of the unemployed have shown toward schoolwork in general and toward commercial and shopwork in particular.

The old saying, "It's an ill wind that blows no one good," is also proved by present-day conditions. Whether or not the individual recognizes the good which is a by-product of the times, is of little moment. The thoughtful student, however, can sense the value of these adverse conditions, and if he so desires, can gain great benefit from them.

To get the greatest amount of good out of present conditions, however, requires that the lessons now learned, under compulsion perhaps, be made to function in the future. Under the lash of stern necessity many have rediscovered that it is quite possible and not nearly so painful as they anticipated, to live according to a reduced income even though the neighbor continues to do as he has always done. These people are to be complimented. Probably for the first time they are directing their own lives according to the dictates of their own minds. Will they continue to do this when prosperity again returns?

There are many, too, who have carefully analyzed what are necessities and what are nonessentials. Will they retain this clarity of vision for the future? Of course, there are others who have cut down on the real necessities just so that one or more of the nonessentials could still be maintained. These poor misguided creatures have not yet learned the lesson which present conditions are to teach. Probably they are the mischievous students for whose sake the rest of humanity is suffering for a more prolonged period, just as the shop teacher keeps the whole class after the dismissal bell has rung simply because a few have chosen to play rather than work.

The present depression may be a blessing in disguise if man has but the common sense to realize it.

THE PRACTICAL JOKER

The average shop teacher looks upon the teaching of safety as quite an important part of his work. The results of the efforts made at school, and of the intensive educational work fostered by industry itself, are showing that this type of education is taking hold. Men are becoming more and more safety conscious at home, on the street, and in the shop. Because of this it is not uncommon to hear of plants employing hundreds of men who go for days and weeks, and in some cases months, without an accident.

There is, however, another phase of safety work which, though touched upon in the school shop, does not receive as much emphasis as it deserves. This has to do with the accidents, suffering, loss of time, loss of money, and even loss of lives brought about by the practical jokes some men feel called upon to play. The practical joke (damnable joke would be a much better name for it) is the cause of much more suffering and grief each year than is commonly known. The following few cases were reported in one of the recent news letters which are published monthly by the chemical section of the National Safety Council. They may serve as the nucleus of an earnest discussion with the members of a shop class, especially one in which the students are about ready to go out into industry.

The first of these stories reports a fatality. A father and son were digging a ditch for a drain pipe. The father, laughingly, threw a shovelful of water at his son. The son retaliated in the same way, but not noticing that his father had moved very closely to him, struck him on the head with his shovel. The man died three days later. The second reports a workman who playfully threw a screw driver at one of his fellow workers. It missed the man it was aimed at, but struck another worker who was peacefully attending to his business, between the ear and the eye causing a painful injury. Another one reports a workman who lost an eye because one of his fellow workers thought it a huge joke to throw a one-inch hexagon nut at him. Another one refers to a workman who died after weeks of suffering from internal hemorrhages produced by

some nit-witted fellow worker's perverted sense of humor coupled with his ignorance of what compressed air can do to the human body.

It will be a gigantic task for the school shop to attempt educationally to curb the activities of all the many future workers who derive huge delight out of the unexpected discomfiture of some fellow worker whom they have surprised by what many individuals think is a real joke, It is a task, however, which is worth the best efforts of the shop teacher.

RINGING TRUE

The old Greek philosopher, Socrates, gave his student companions the wise admonition "Know thyself." It is hard to say just how far this genial old man intended his followers to extend their self-analysis, but his advice is still good. It is especially important to the teacher, because the teacher's duty demands of him that he transmit not only factual, practical, and technical information, but that he also implant proper character habits and attitudes so that his product — the student — can properly fill his position in society.

Naturally the teacher must possess the characteristics which he wants to transmit. To obtain the best results, nay, any results, his teaching must be, "do as I do," not merely, "do as I tell you."

If this be true, the teacher must ever be on the *qui vive* for his own failures and shortcomings. There may not be any let-up at self-training and improvement if he finds upon self-analysis that he does not possess the qualities that he is to produce in his students. The bell metal, foul with dross, cannot produce a sweet-sounding bell until it first be purified.

These truths seem self-evident, yet they are frequently ignored by teachers who seem to feel that they can develop truthfulness, honesty, and other desirable characteristics, while they themselves say and do what is not truthful, honest, or upright.

Posing may fool those in authority part of the time, but it will not remain hidden from the student very long. After the boy has obtained the real measure of the teacher's stature, the instructor's weaknesses will not long remain secret. All the posing in the world will not efface the contemptuous appraisal which disillusioned youngsters will flippantly spread. Neither will posing prevent dismissal when those in authority find that what seemed to be true was not true at all.

The advice of the old philosopher, therefore, still possesses weight. To fully measure up to the standard laid down by Socrates for his students, one must work hard to develop the right habits, train within oneself proper attitudes, acquire a thorough knowledge of one's subject and of how to teach it to others. But above all, one must be honest with one's time and effort on the job. Some teachers, like some industrial workers, may think they can succeed by giving but a portion of their time to their real task and spend the rest on work of their own. They are usually disabused in a hurry.

Dishonesty of any kind is not only abhorrent to teachers, it is equally objectionable to the student.

GETTING THE MOST OUT OF THE MAGAZINE

INDUSTRIAL ARTS AND VOCATIONAL EDUCATION offers a number of very definite things to its readers. There are, first of all, the general articles, which though they may be written for a specific classroom or shop, nevertheless carry something that may be transferred, usually with little change or adaptation, into the life of today's schoolwork, or into the planning for the future.

Some teachers may feel that the most important part for them is the problems-and-projects section. It is true, this portion of the magazine aims at giving the reader suggestive hints that can be bodily taken into the classroom with little or no change. However, the general articles in the magazine are those which assist the instructor in acquiring his general professional background. The reader who limits himself to the reading of only that which is of immediate use to himself, is depriving himself of an acquaintance with the personalities and thoughts of educational leaders who are now making history in the fields of industrial arts and vocational education.

Then there are the posters which give shop teachers an opportunity to keep their bulletin boards alive. It is true, not every poster is adaptable to every school shop. The safety hint for the machine shop could not be used by the teacher of printing. If, however, none of the posters which appear can be used on the bulletin boards of a certain type of school shop, it is pretty conclusive evidence that the teachers in that particular subject have developed no poster material, or they have not seen fit to make it available to their fellow teachers.

The supplements are the next item of interest to the teacher. These, of course, are only for those who make use of blue prints in their shops. They cover a wide variety of school-shop subjects, however, and make it very easy to supply students with individual plans.

Besides the foregoing, there are items of interest to all on personal notes, news notes, book notes, and association and convention news.

Last but not least is that vast field of real educational material which the advertisers offer each month to the readers of the magazine. This section deserves much more time than is ordinarily given to it. The advertiser is trying to do real educational work when he places his advertisement in the teachers' professional magazine. It is not a one-sided affair with the gains all on the side of the manufacturer or dealer. On the contrary, the school teacher, the supervisor, the principal, the superintendent, and the school business manager are greatly indebted to those who inform them how and where the thousands of items needed in a school system may be most advantageously bought.

The reader who wants to get the most out of his magazine must carefully budget the time which he can spend on the reading of it. He must not forget, however, that it offers a wide variety of subject material, and that all of it, be it editorial or advertising material, is of such importance that nonattention to any part of it may mean a real loss.

Industrial-Arts Credits

*Roy G. Fales**

IN deciding to grant the same credit for courses in industrial arts as for academic subjects, the New York State Education Department has contributed to the leveling process now taking place between academic and nonacademic courses of study. In taking this action, the department has paved the way for the organization of a type of course sufficiently high in content and interest value so as to attract the attention of boys who usually enroll in college-preparatory courses.

Courses for Credit

To understand the reason for this victory on the part of industrial-arts education, it is necessary to compare former and present practice. Formerly, industrial-arts courses were offered as electives to boys in senior high schools. The courses were usually organized by local teachers and submitted by them for approval to the state education department in an attempt to make local courses meet local needs. They called for two periods daily throughout the school year for one unit of regents' credit. The courses were of the unprepared or laboratory type in which all of the work was done in class. In some schools the courses had a high educational value; in others they degenerated into mere shopwork periods.

The question of credits proved the undoing of this type of course. Here and there, high-school students of a critical turn of mind began to ask why they should have to give two periods daily of school time to secure one unit of credit, when half that amount of school time given to other subjects also earned one credit. Their arguments proving valid, the State Education Department took steps to reorganize their credit ratings on this subject.

Beginning in September, 1931, high schools were allowed to offer industrial-arts courses for one period daily, together with a like amount of time for outside preparation for which one unit of credit was granted on completion of the course. This innovation makes it possible for college-preparatory students to study industrial arts on an elective basis without sacrificing an undue amount of their elective time.

The new regulation becomes mandatory in September, 1933, and on or before this date all courses must be revised and submitted for approval to the State Education Department.

Outside Preparation

The question of outside preparation for these courses has been liberally interpreted. Most of the outside work must be of such a character that the boys will like it and not consider it as a task that must be performed. Here, we look to the boy for suggestions. Some boys play so hard at making certain types of construction that they never think of it as work, though it actually is. Such play is never useless and frequently leads to a form of guidance which formal classroom study never attains. Imagine the possibilities offered to boys who become interested in kites, model airplanes and boats, radio, small motors, engines, pumps, electric trains and a host of other things. This type of construction has long been offered as club activities, but the schools have seldom encouraged it.

Collecting is another form of outside preparation which offers wonderful possibilities for study. Boys like to collect stones, wood, metals, papers, tools, and many other things. Suppose a boy likes to collect stones. If so, he may cut, grind, polish, lap, and mount them in a fascinating manner. Other boys may want to make mechanical drawings, sketches or designs for projects. Still others will engage in repairing household implements and looking after the upkeep of the many labor-saving devices now used in the household. This activity has been given the broad name of household mechanics.

This work is all informal and cannot be made subject to class assignment. The object of it is to help the boy crystallize his thoughts in order to discover his likes, dislikes, aptitudes, abilities, and interests. This can be done by helping him to make contacts with various things, all of which will give him experience and serve as a basis for choosing an occupation.

Formal Study

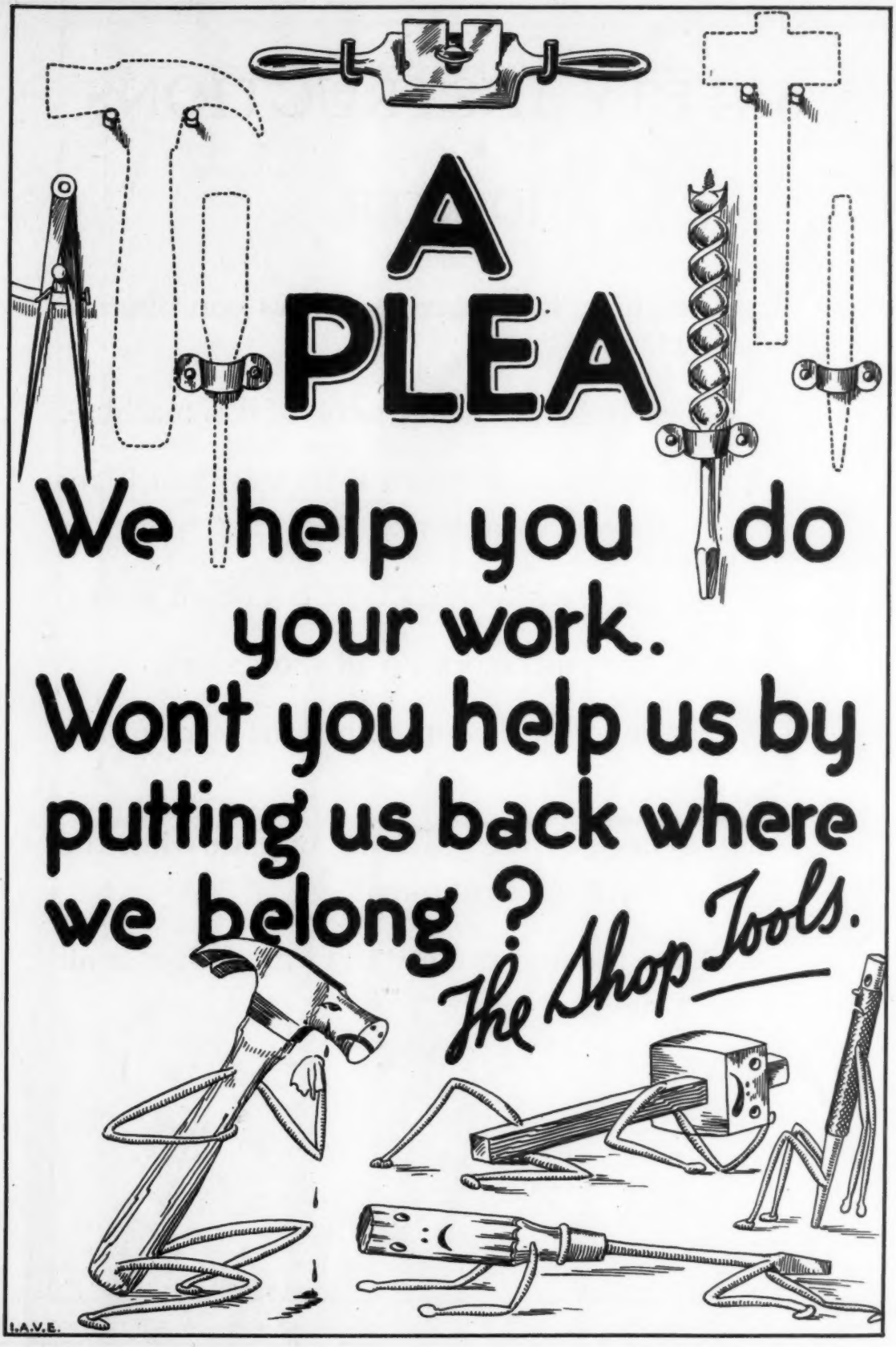
Certain things, like board measure, a boy can learn best through reading and study. They should be woven into the daily work of the school, but the time allotment for them should not exceed 30 per cent of the time given to outside preparation. The danger of overemphasis in formal study lies in the fact that boys in school shops want to make things. They do not want to talk or study at that time.

In order to make the courses of study meet the needs of pupils in all communities of New York state, the State Education Department requires each industrial-arts teacher to organize his own courses. Descriptive statements are furnished him which outline the plan and scope of the courses. These the teacher can change to fit his local situation.

Courses recommended for the junior high school are all general in character. The type of shop recommended depends on the size of school, not on local occupations. This is done because general wood, general metal, and general electricity have been established as the minimum core content for these grades. Textiles, ceramics, and leather work will be added later.

Thus has come about a broader concept of the place industrial arts should play in the school curriculum and with this broader concept it is hoped that the subject will widen in appeal to the school population of New York state.

*State Supervisor, New York State Education Department.



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Submitted by E. W. Manzer, Bronxville, N. Y.

SAFETY INSTRUCTIONS

JOINTER

This machine is dangerous unless you observe the following:

1. Never talk to the operator of this machine.
2. Never run stock which is shorter than 10 in. long across this machine.
3. Set the machine for a light cut on all work.
4. Use the push block on all short work.
5. Never adjust the fence until the machine has stopped.
6. Do not pull the guard out of place while the machine is running.
7. Keep the fingers away from the knives at all times.

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Submitted by Lyle M. Garnett, Milwaukee, Wis.

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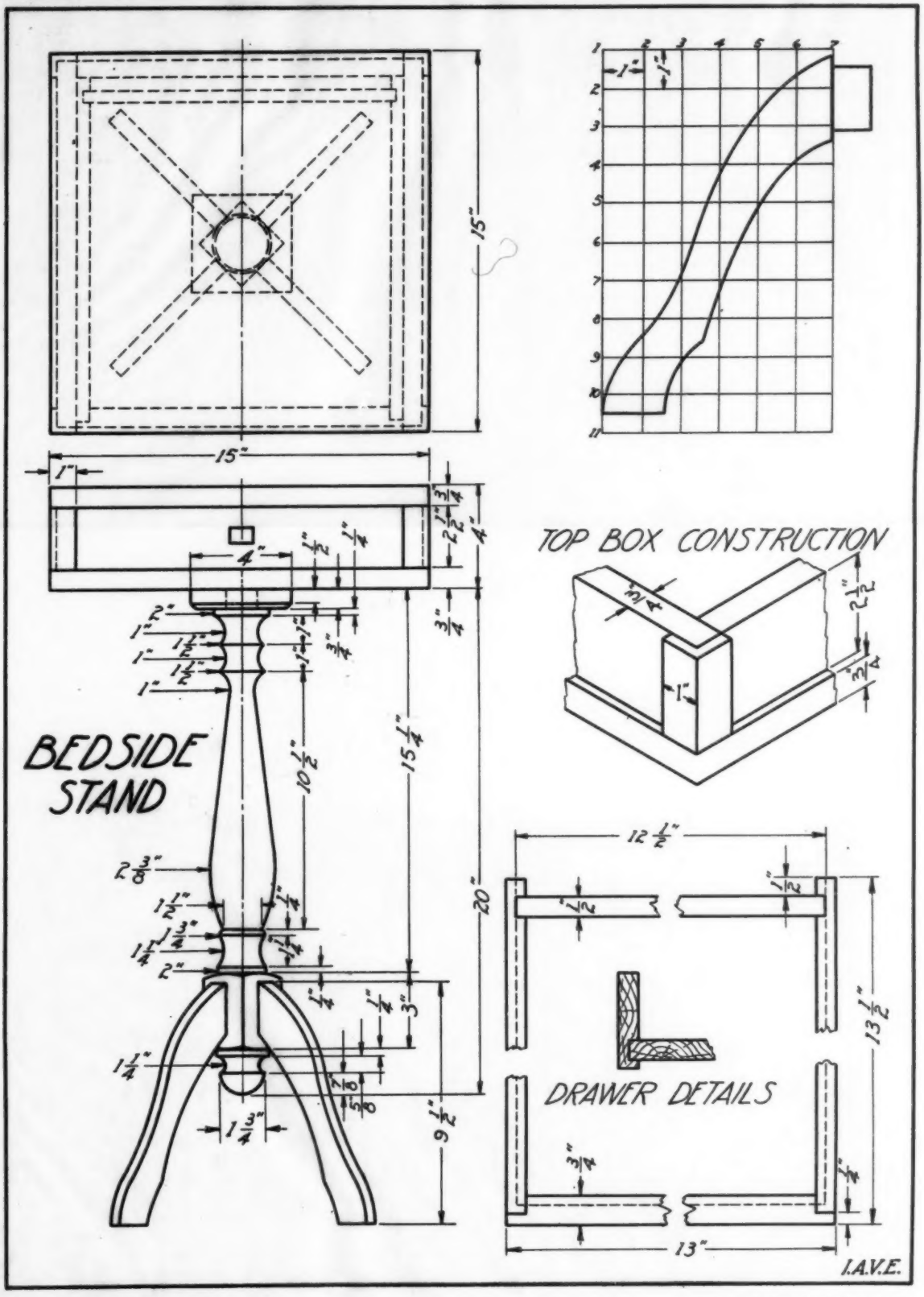

Designed by Richard Noyes, Moorestown, N. J.

Described Elsewhere in This Issue

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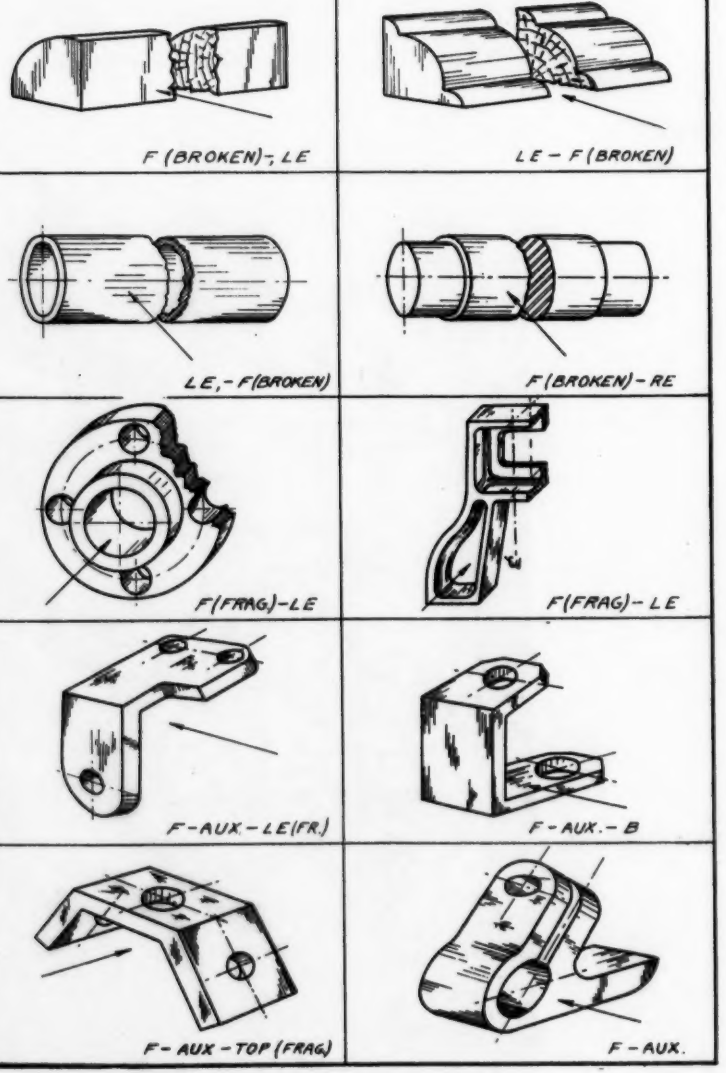
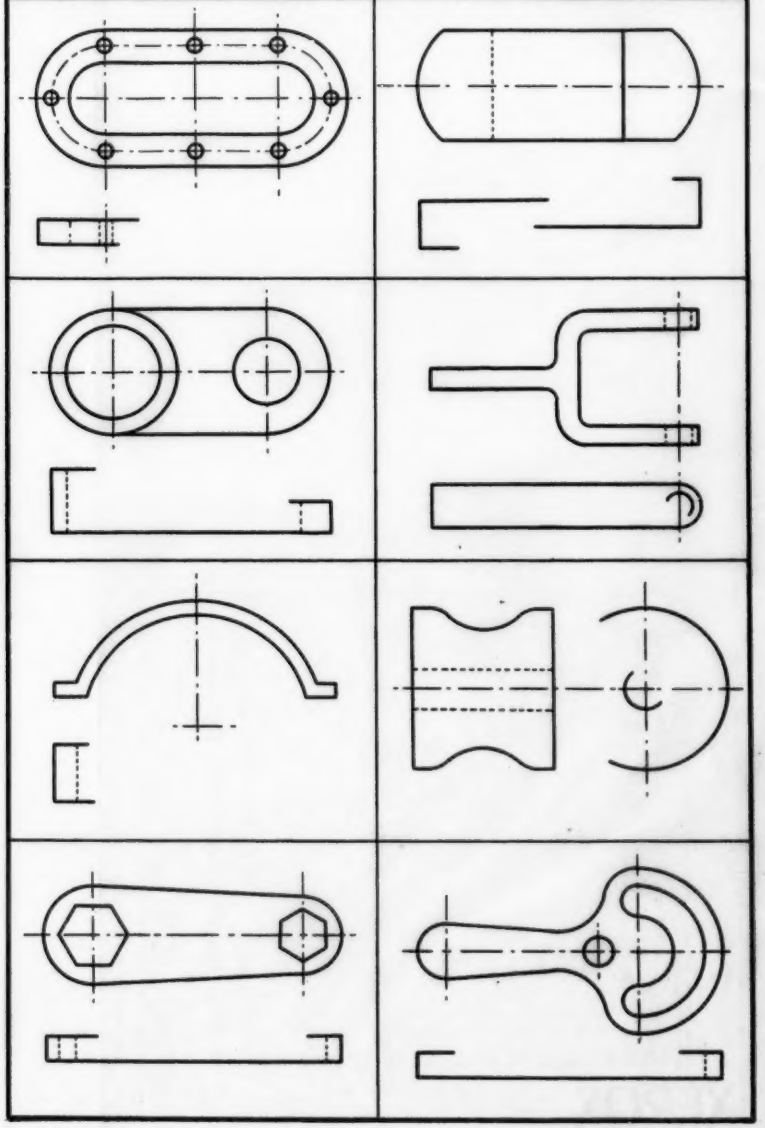
FREEHAND SKETCHING. BROKEN, AUXILIARY & FRAGMENTARY VIEWS. № 9.



Submitted by Jonathan Bright, Erie, Pa.

FREEHAND SKETCHING TEST - COMPLETION PROBLEMS. № 10.



Described Elsewhere in This Issue

PROBLEMS & PROJECTS

BEDSIDE STAND

Richard Noyes, High School, Moorestown, New Jersey

(See Supplement No. 250)

The bedside stand described and illustrated herewith makes a very attractive project for high-school classes. It may be made of white wood or yellow poplar with a walnut stain, or ivory lacquer, antique finish. With decorative drawer pull and painted or decalcomania designs on the panels, it is especially attractive.

The top may be fastened to the sides by means of glue and dowels, or slender flat-head screws may be used up through the sides. If the latter method of fastening is used, holes about 1 in. deep, large enough for the head of the screws to slip through, should be bored through the sides. A screw 3¼ in. long will then be required.

FREE-HAND, THIRD-ANGLE PROJECTION FOR BEGINNERS IN MECHANICAL DRAWING

Jonathan Bright, Academy High School, Erie, Pennsylvania

(Continued from July, See Supplement No. 251)

Problem Sheet No. 9

This sheet contains three distinct types of problems and each may be studied separately. Broken and fragmentary views are studied at the same time and their like and unlike characteristics should be discussed. Auxiliary views are studied in a different lesson period, although they may be taught at the same time if the ability of the students warrants it.

Problem Sheet No. 10

A sheet of completion problems which does not need any additional explanation.

RUSH-STYLE FOOTSTOOL

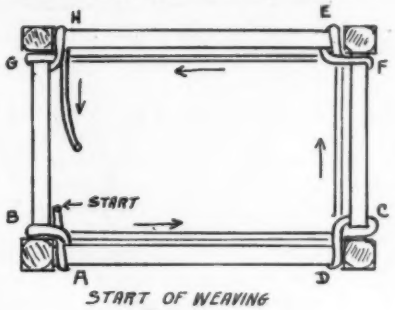
F. G. Kendrick, Grand Rapids, Michigan

A simple footstool, embodying the principles of rush-style seat weaving, not only furnishes a practical and useful project, but it arouses interest, creates desires, and will be found to be an aid in quickly raising class standards.

Gumwood legs, 1 15/16 in. square, 9 in. high, are used, holes are bored to accommodate four side stretchers 7/8 by 16 in. and four end stretchers 7/8 by 11 in. After assembling, finish the framework in the color desired. The one pictured is finished in natural, well-sanded, shellacked, and varnished. After drying, the seat is applied.

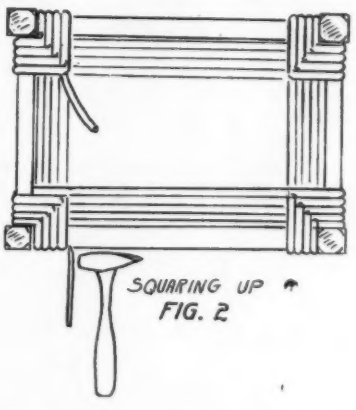
Rush-style fiber cord has a blending of color that gives to the finished seat the appearance of natural green rush. It is easy to work with, requiring no water soaking, and the continuous strand enables one to work with what can be conveniently handled at one time. Take a small stick or similar object, and wind on it sufficient fiber cord to handle easily.

Start in the lower left-hand corner at A in Figure 1, place the end of the weaver over the rail, holding it with the left hand. Then carrying the material in the right hand, bring it forward wrapping it around the stretcher A, go under, come over the left end of stretcher B, come under and go across and over the right end stretcher C, come under and over on the side stretcher D, going around and under, across to the



START OF WEAVING
FIG. 1

back stretcher E, go over, come under and go around over the right end stretcher F, coming under and across to the left end stretcher G, going over and under, then over back stretcher H, coming under, back to starting point, repeating this operation until the ends of the stool are filled in.



SQUARING UP
FIG. 2

On every sixth or seventh time around it is well to tighten the work by tapping at the rails, forcing the strands close together, and squaring each corner. The method of doing this is shown in Figure 2. By keeping the work lined up or squared up a much better finished project is produced.

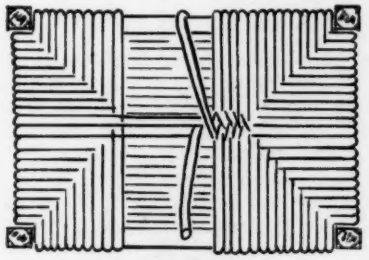
Whenever the material on the improvised bobbin has been used up, tack the end of the underside of the rail, beginning the new strand by butting it up to the end just fastened down, and tacking the new end securely. Before tacking end of weaver, or beginning a new one, be sure the work is tight and in line, forcing strands as tight together as possible.

Begin packing the seat at this point in the procedure. This is done by taking newspaper or any substitute, and forcing it in under the strands. This helps to tighten the work and builds up the seat. It is well to pack each time the work is squared up.

When the two ends have been filled in, be sure that as much

has been put in as possible, then tighten it up, and if another strand or two cannot be forced in, proceed to fill in the center.

The reason the ends fill in first, is because the project is rectangular, and naturally the narrow ends fill in before the sides.



FILLING IN THE CENTER
FIG. 3

To complete the center, go back and forth, front to back, going over, coming under, going over, continuing, squaring and tightening up occasionally, as well as packing. This is shown in Figure 3. Force in as many strands as possible.

The seat is now complete except for finishing. Turn it upside down, and pack as much as possible from the underside, forcing the packing between the weavers, starting at one side, and gradually working toward the center. After the seat has been packed as tight as possible, apply a liberal soaking of glue sizing. Try not to brush but sop the glue sizing on. Dipping is still better if you can do it. Let the size dry thoroughly and then apply a coat of clear varnish.

PORTABLE WORKBENCH

W. E. Durbahn, Deerfield-Shields Twp. High School, Highland Park, Illinois

The portable workbench illustrated and described herewith fills the need of the present-day building mechanic, especially that of the carpenter. It is a bench that can be taken to the work instead of taking the work to the bench. It is adjustable for all sizes of work, ranging from a small cupboard door to a 3 by 7 ft. door. It is sturdy in construction, yet light enough so that one man can carry it about.

The length and height as given in the illustration may be altered to suit the particular needs of the individual. To hold

THE PORTABLE WORKBENCH IN USE

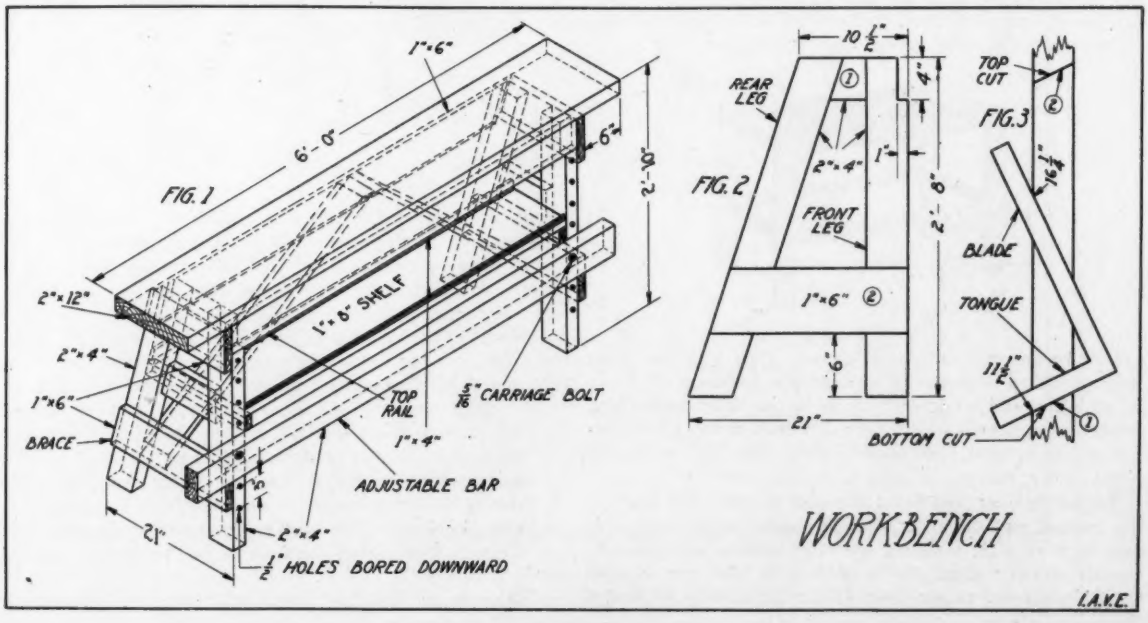
the work a small woodworker's vise or a piece of board with a notch may be clamped to the bench at one end. Figures 1 and 2, showing the assembly and details of the bench, are self-explanatory as is also Figure 3, which shows how to lay out the angle cuts for the rear leg. After having cut out the material for the legs, fit and toenail a piece of 2 by 4, marked 1 in Figure 2, between the legs at the top. Over this, nail a piece of 1 by 6, as shown in Figure 1. The 1 by 4 braces which extend from the leg braces to the center of the top on the underside should be nailed as far to the rear as possible to allow room for the 1 by 8-in. shelf beneath.

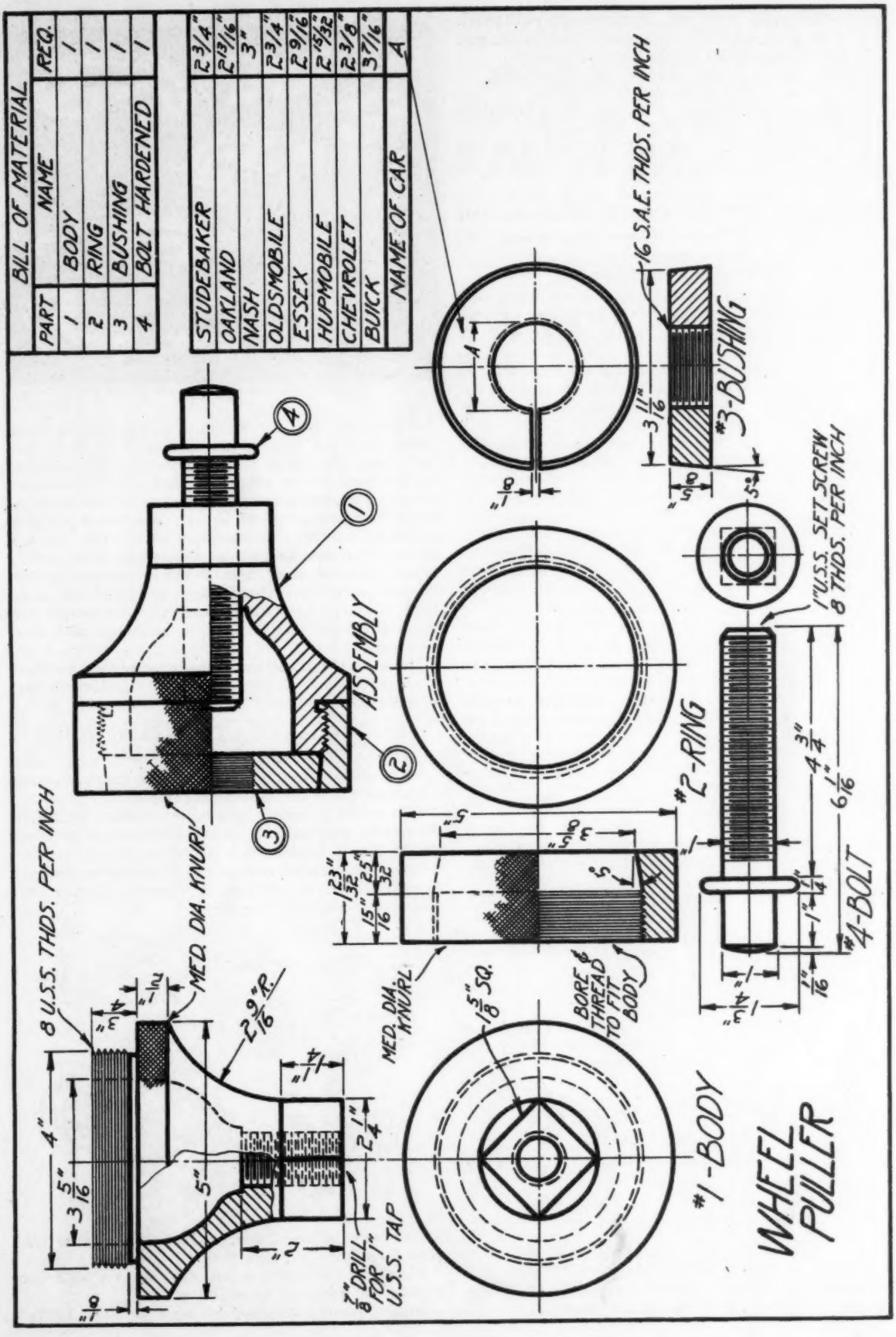
This shelf is supported on 1 by 2 cleats, fastened to the legs. It should be about 7 in. below the top rail. A 1 by 2-in. strip also may be nailed along the ends and back and a ¼ by ¼ strip along the front of the shelf to keep tools and nails from rolling off.

A MASTER WHEEL PULLER

William R. Lloyd, Washington Trade School, Pittsburgh, Pennsylvania

The master wheel puller shown herewith was designed and made in the machine shop of the Washington Trade School. It




BILL OF MATERIAL
PART NAME REQ.
1 BODY 1
2 RING 1
3 BUSHING 1
4 BOLT HARDENED 1
STUDEBAKER 2 3/4"
OAKLAND 2 13/16"
NASH 3"
OLDSMOBILE 2 3/4"
ESSEX 2 9/16"
HUPMOBILE 2 15/32"
CHEVROLET 2 3/8"
BUICK 3 7/16"
NAME OF CAR 4
WHEEL PULLER
#1-BODY
#2-RING
#3-BUSHING
#4-BOLT
ASSEMBLY
8 U.S.S. THDS. PER INCH
MED. DIA. KNURL
2 9/16" R.
5"
4"
3 5/16"
2 1/4"
2"
7/8" DRILL FOR 1" U.S.S. TAP
1/8" SQ.
BORE & THREAD TO FIT BODY
5/16 S.A.E. THDS. PER INCH
1" U.S.S. SET SCREW 8 THDS. PER INCH
4 3/4"
6 1/16"

has been thoroughly tested and has proved very satisfactory.

In order to use the wheel puller, follow these instructions:

1. Select a bushing that fits the hub of the wheel.
2. Place the ring or sleeve over the hub of the wheel.
3. Screw the bushing on the threads of the hub.
4. Screw the head, by hand, on the ring until it fits tightly.
5. Tighten up on the bolt with a large wrench.

If the wheel does not come off, hit the head of the bolt with a heavy hammer, tightening it with the wrench at the same time.

ELEMENTS OF JOB COMPOSITION—VII

Frank P. Rich, Roxbury Memorial High School, Boston, Massachusetts

Determining Type Display

Display in printing is an endeavor to bring out more prominently certain parts of a given piece of copy by means of various arrangements or by contrast in the sizes and styles of type used.

The first thing the compositor or advertising man must do is to analyze his copy and choose the parts which he will display. This requires judgment. A little forethought, however, will overcome much of the difficulty.

Select the type you are going to use. Consider whether it is appropriate for the job on hand. This is desirable in all classes of typography.

Read your copy. Understand what is wanted. Then ask yourself the questions:

1. Who is it?
2. What is it?
3. Where is it?
4. When is it?

The answers you get are your clues to display.

Having determined the size of type to be used for your most important display line, the sizes of type to be used for the other lines will be indicated in most jobs by the order in which the above questions are answered.

The order of display having been determined, a layout should be made in order that an intelligent idea may be had as to its ultimate arrangement.

EXAMPLE

Copy for a ticket, 1½ by 2½ in.: Commencement of the Boston Latin High School, Tremont Temple. Boston, Tuesday, June 6, 1926, at 8 P. M. Admit Bearer.

Importance Factors

1. Who is it?
2. What is it?
3. Where is it?
4. When is it?

Remainder of copy has been set in smaller and lighter faces of type.

COMMENCEMENT
of the
Boston Latin High School
TREMONT TEMPLE
Boston
Tuesday, June 6, 1926, at 8 P. M.
Admit Bearer

EXAMPLE

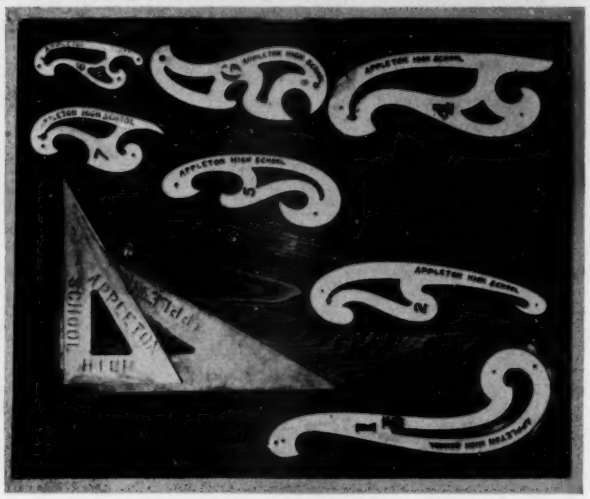
Copy for a business card 1½ by 2½ inches: The C. E. Osgood Co., House Furnishers. Cash or Credit. 600 Washington Street, Boston, Mass. Wm. Osgood, Mgr. Tel. Beach 1234.

Tel. Beach 1234 Wm. Osgood, Mgr.
THE C. E. OSGOOD CO.
House Furnishers
CASH OR CREDIT
600 Washington St. Boston, Mass.

MARKING FRENCH CURVES

Harry Cameron, High School, Appleton, Wisconsin

We always had difficulty in checking the French curves in and out until the following method was developed.



A panel was built large enough to accommodate all of the curves. On it were mounted pins upon which the curves were to be hung. The outline of each curve was then marked on the board and this was traced with black lacquer. The curves were then numbered, and the numbers were lettered on the board. Then the surface of each of the curves was slightly roughened with very fine sandpaper (wet or dry 5-0), and India ink was used to letter the name of the school and the number on each one of them. It was necessary to go over the lettering a second time in order to make it an opaque black. A heavy coat of clear lacquer was then sprayed over the lettered side of the curve to make the work more permanent.

It was found that one heavy coat of lacquer will last about a school year, and it is only necessary to recoat with lacquer to hold the lettering.

HOW TO MAKE A CROSS-LAP JOINT

P. S. Burns, Seattle, Washington

Whenever possible it is well to square up the material as a whole piece before cutting into parts (Fig. 1).

It is well to lay out the joint by superposition (that is, by placing one piece upon the other), otherwise one must rely entirely upon measurements.

When pieces are squared up, find the middle of the width of piece No. 1 at its end Point A, Figure 2, and make mark clearly on end opposite face side.

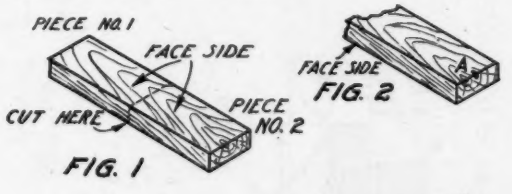


FIG. 1

FIG. 2

FIG. 3

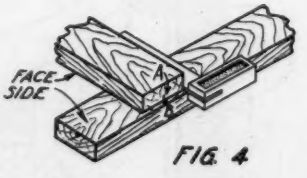


FIG. 4

Find center of piece 2 in regard to length and make mark point B on face side, Figure 3.

Place piece 1 on piece 2 so that center marks A and B come together and guide with square, Figure 4.

Remove square and mark points *x*-*y* on each side, Figure 5.

Next remove piece and replace square and square lines across through points *x-y* Figure 6.

Square down lines *x-y* on each side equal to one half the thickness of the piece. Place head of square on face side, Figure 7. (It is well to give other method here as it is often used for small work.) Pieces are squared with each other and clamped, then marked off as shown in Figure 8. Later, square down sides as given in Figure 7.

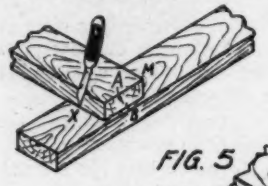


FIG. 5

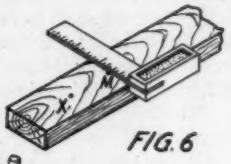


FIG. 6

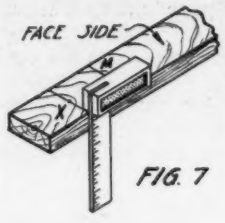


FIG. 7

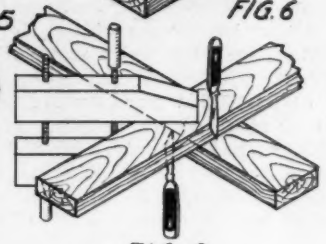


FIG. 8

Repeat the above operation for both pieces, using care that face side of both pieces will always be on top (on one piece mark the face side and on the other mark the reverse side).

Next use marking gauge and mark edges of each piece between lines *x-y* as squared down. The gauge should be set at one half the thickness of the piece and the head of gauge held against face side, Figure 9.

Next use crosscut saw and cut down along line *x-y* to depth of gauge mark. Saw cut or kerf should just touch the lines and be in between them in waste material marked by A in Figure 10.

Next chisel out waste material. First drive chisel in about ¼ in. on one side along marking gauge line, Figure 11. Then reverse and chisel from the opposite side slanting chisel upward, Figure 12. Cut full depth about one fourth way across the piece, Figure 13.

Again reverse sides. Chisel as in Figure 14 and finish as in Figure 15. Check for uniformity of depth by one of the following methods: (1) Use square or straightedge, Figure 16; (2) Hold pieces together level as shown in Figure 17, and light may be seen in the full width of the joint; (3) Use trial stick and hammer in nail so it will project the proper amount for the depth of the joint as shown in Figure 18. A shows how to make stick, B, how to use it. Joint should fit together but without being forced by clamps or hammering, Figure 19.

The following shows effect of a joint being forced together. If piece is level on top and force is applied to opening at points A and B, Figure 20, forcing them apart, it will result in a curved surface as in Figure 21. The other piece will curve in the opposite direction resulting in a very poor joint.

In a wide joint it is well to make several cuts of the saw in the waste material before starting to chisel as in Figure 22. The waste material is sometimes pared out, as shown in Figure 23.

TO THE NEW EVENING-SCHOOL STUDENT

Editor's Note: **This note to the new evening-school student was used by Mr. J. I. Sowers, director vocational education, Miami, Florida, in the evening schools under his supervision. It is reproduced herewith because it may be helpful to others who have charge of this form of adult education.**

Let us assume that you are now enrolled in the evening classes for the first time. You came with a very definite desire to get something — some kind of help toward an educational goal. Be certain that you get enrolled in the right courses — courses that meet your needs and are common to the objectives toward which you are working. In order to get the best out of evening-school instruction you ought to be willing, and you ought to expect to do a great deal of outside reading, study, and investigation. Those who have been disappointed in the result of evening-school study usually have been the persons who seemed to labor under the general impression that education can be sprinkled on.

In point of time the evening schools are short. There are more than 1,200 hours in the ordinary full-time school year. In contrast to this there are only 120 hours in a full year of evening-school work from October to the middle of May. As a matter of fact, one *month* in the full-time school is about equal in time to a full *year* of evening-school work. However, a great amount of work can be accomplished in evening schools even within the limits of one term, if the student is earnest and looks upon the school and the teachers as a place to get the help needed and the direction necessary to his own study.

No one ever becomes really cultured, educated, or better trained until he himself enters into the process to the extent of carrying on his own. Your teacher is *instructing* you when he furnishes you information about things or directions for

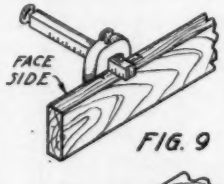


FIG. 9

FIG. 12

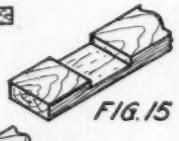


FIG. 15

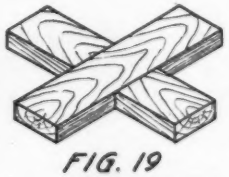


FIG. 19

FIG. 23

FIG. 13

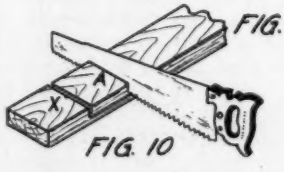
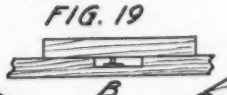


FIG. 10

FIG. 18



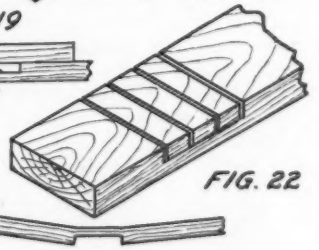


FIG. 22

FIG. 16

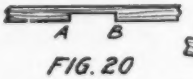


FIG. 20

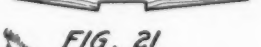


FIG. 21

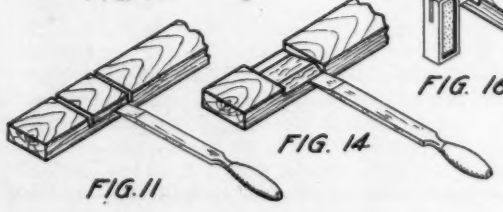


FIG. 14

FIG. 11

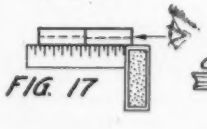


FIG. 17

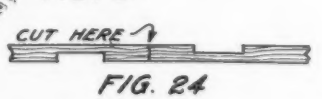


FIG. 24

doing something, but he is *teaching* you when he gets you to *thinking constructively* and definitely and going into the subject under your own power. Both Socrates and Jesus were *master teachers* because they stimulated men to think and to reason.

When we deal with young children we are usually content with instructing (telling about things), but when we meet with adults in an evening class it should be, and is our aim to so direct the thought that we shall be really *teaching*. For instance, you are asked to tell about the discovery of America and you do. You state *all* facts — which are interesting but easily obtained. Now suppose you are asked why, when Columbus set sail from a certain point in Spain, he arrived at a certain other point in America. You now have a *thinking* job and you are off on a voyage after facts. Your instructor is out of the picture, you are doing the teaching, and your pupil is *you*.

I hope it is this kind of mental reaction which you are expecting from your evening-school work. You have now reached adulthood; what you should expect and get from your teachers is largely guidance and direction in your own study. We are all students, all learners. This world is a mighty fine, interesting old place. The best and highest type of folk found in any locality are those enrolled in evening schools.

FIVE-SOCKET CANDELABRUM

George J. Coleman and Charles Farina, Lane Technical High School, Chicago, Illinois

The wrought-iron candelabrum described herewith resulted from the coöperation of the drawing room and the forge shop. The project was designed for advanced students. While the drawings are self-explanatory, a short description may be found helpful.

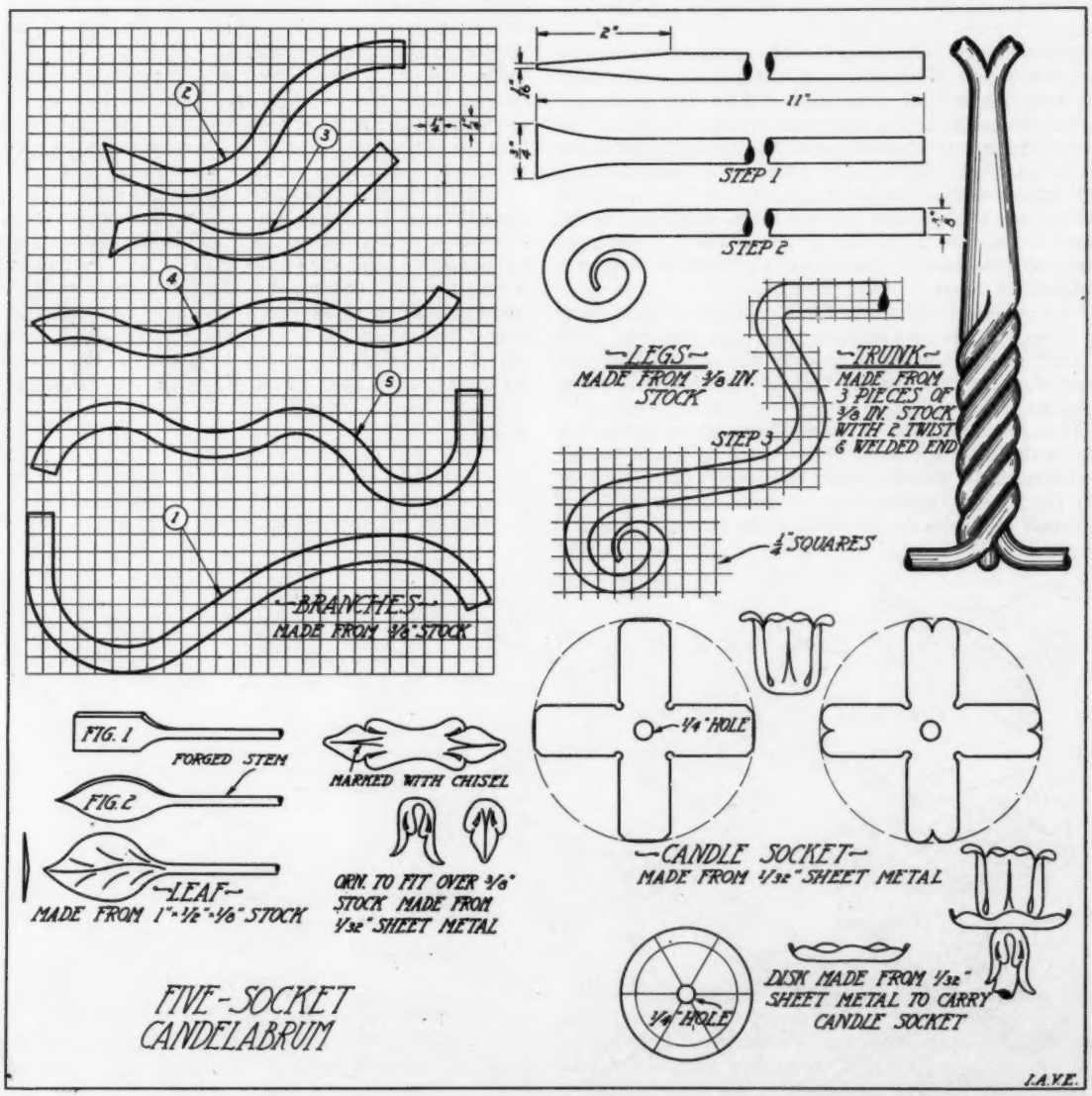
The first step was to make a layout assembly on a piece of sheet metal. This was found helpful when the different parts were being assembled as the layout did not burn up when hot material was tried against it for correctness of shape.

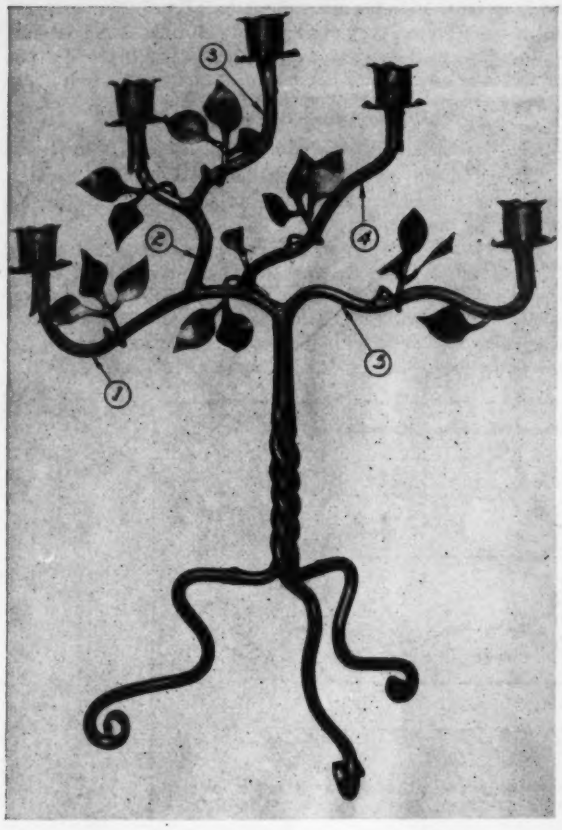
Branches. It may be well to start with the making of the branches as they are the least difficult to produce.

a) Lay out the five different shapes on light sheet metal. Cut out the shapes with a pair of snips and use them as patterns.

b) Heat 3/8-in. round stock of the correct length and bend to the various shapes needed.

Legs. The legs are also made of 3/8-in. round stock. Taper one end as shown in the illustration under step 1. Then scroll the flattened end as shown in step 2 and give the final shaping to the leg as shown in step 3.





Trunk.

a) Take three pieces of 3/8-in. round stock of the correct length, bunch them together, clamp and weld each end securely.

b) The part to be twisted is then heated evenly to the correct length and this section is given two complete turns.

c) Next heat the upper part of the trunk to a welding heat and weld and draw it out as shown.

d) Straighten out the other end and spread the stubs 120 deg.

Leaves. The leaves are made out of ⅛ by ½-in. stock.

a) Leaving a piece ⅛ by ½ by 1 in. at one end, draw out the other into a stem ⅛-in. diameter as shown in Figure 1.

b) Next draw out the ⅛ by ½ by 1-in. end as shown in Figure 2. Bevel the edges of this end until the widest part is 1 in. wide. The center should be left about 1/16 in. thick and the edges should be drawn down to almost nothing.

c) Finish the edges and mark the veins with a cold chisel.

d) Weld the leaves into pairs and triplets as required. (See halftone cut.) The single leaves are left just as they are finished after operation *c*.

Candle Socket. The candle socket is made out of a piece of sheet metal about 1/32 in. thick and 3 ¼ in. square or round.

a) Punch-mark center and lay off a circle 1 in. in diameter. Make four centerpunch marks 90 deg. apart on the circumference of this circle, and drill ⅛-in. holes as shown in the illustration.

b) Drill center hole ¼ in. and lay out the cup as shown in the illustration.

c) Cut out the shape with a pair of snips and bend the cup to fit the candle. It may be best to make the socket so that a rubber bushing may be used with the candle.

d) Flair the top edges of the socket as shown.

e) The drip cup is cut 2 in. in diameter with a ¼-in. hole in the center. The edges may be scalloped with a peen hammer over a piece of 1 ½-in. diameter stock.

f) The ornament which is placed beneath the drip cup is next made. Cut it out as shown in the illustration, mark it with a chisel, bend it over a piece of ⅜-in. round stock, and drill a ¼-in. hole through its center.

Assembly.

a) Using the assembly template that has been made, cut parts to length and weld them together as shown.

b) Weld on the leaves and bend and twist them to suit.

c) Weld ornament over branches that support candle socket.

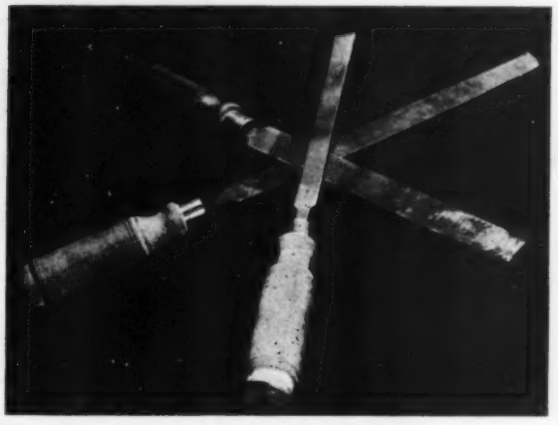
d) Tack-weld drip cup and socket together. Place in position and weld.

e) Finish the candelabrum to suit.

HANDY GLUE SCRAPER

George C. Donson, Director Industrial Education, Washington, Pennsylvania

An old worn-out file may be turned readily into a glue scraper by heating it and drawing it to a point. This is then turned up about ½ in. The file is then heated to a cherry red and dipped into a can of linseed oil. It is then ground on an emery wheel, and if an exceptionally fine cutting edge is wanted, it may be finished on an oilstone. This scraper is found to be of much use in the woodworking department as it saves the plane irons. It also is an excellent project for the general shop.



GLUE SCRAPERS MADE OF OLD FILES

A BENT-WOOD PROPELLER FOR MODEL PLANES

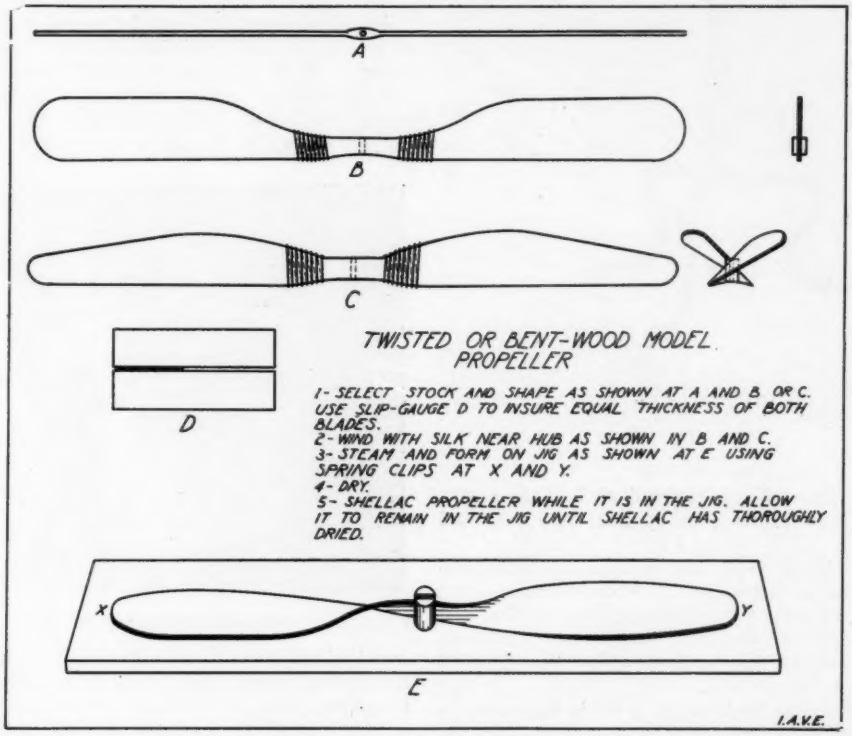
C. A. MacMiller, Lincoln School, Hibbing, Minnesota

When the carved wood propellers made by a class are examined, it is found that usually no two are really alike. Furthermore, considerable time and effort is spent in producing, by this method, a propeller that is reasonably light. There are always a number of boys in a class who are not handy with a knife, and these frequently break their propeller just when they have almost finished it.

The method of making bent-wood propellers described herewith eliminates a lot of this trouble. To begin with, the piece of stock from which the propeller is to be made can be very nearly sawed to correct size before the actual carving begins. There is really no carving to be done since the entire blade and hub are cut out while the stock is still in the *flat* as shown at A, B, and C. The hub section is left slightly thicker as shown at A. It is well to make a gauge block (as shown at D) which may be used to gauge the thickness as the blade is being planed and sanded down so that the thickness of both sides is made exactly alike. When the stock has been brought down to the correct thickness, it is best to make a paper pattern and trace the same on each side of the hub in order to

have both halves of the blade alike as to shape as well as to size.

After the stock has been carefully shaped, wind and securely fasten about a half dozen turns of fine silk thread about the propeller on each side of the hub section, as shown at B and C. The propeller is then ready to be bent or rather twisted to its proper pitch. To accomplish this, take a board a little longer than the propeller (this board may be used again and again for making other propellers) and mount a little piece of 5/8-in. dowel rod perpendicular to the plane of the board at its center. Cut or saw a slot into this of such a size that the thick section of the propeller will just snugly slide in without being loose. Soak the propeller in boiling water for a few minutes, quickly put it into the slot in the dowel pin and twist the extreme ends of the blades in opposite directions until they are down against the board. Ordinary spring clothespins or spring paper fasteners or large paper clips may be used to hold the ends of the propeller in the *twisted* position. Allow the propeller to dry until the succeeding day and then give it a liberal coat of rather thin shellac (*while it is still in position on the jig*) and again allow it to dry for about three hours in a warm place. When thoroughly dry, remove the propeller from the jig and sand lightly with split sandpaper or any fine abrasive. When released the blades will spring back toward the *untwisted* position to some extent, so that the blade gets a little pitch angle even at its very tip. Propellers with different pitches may be made by placing small tapered blocks under the tips of the blades before applying the clip to hold them in the twisted position. Propellers made in this manner are much more easily made than the carved ones and they will have more nearly the same pitch on both blades. They also will stand much more abuse in actual use than the carved ones.


A
B
C
D
TWISTED OR BENT-WOOD MODEL PROPELLER
1- SELECT STOCK AND SHAPE AS SHOWN AT A AND B OR C. USE SLIP-GAUGE D TO INSURE EQUAL THICKNESS OF BOTH BLADES.
2- WIND WITH SILK NEAR HUB AS SHOWN IN B AND C.
3- STEAM AND FORM ON JIG AS SHOWN AT E USING SPRING CLIPS AT X AND Y.
4- DRY.
5- SHELLAC PROPELLER WHILE IT IS IN THE JIG. ALLOW IT TO REMAIN IN THE JIG UNTIL SHELLAC HAS THOROUGHLY DRIED.
X
Y
E
I.A.V.E.

NEW CALIFORNIA SCHOOL LAW

"Go to School or Work" is the object of California's new "antiloafing" or continuation-school law, which became effective this year. It provides that all pupils who have finished high school shall attend school full time when not employed.

The part-time phase of the law which has been changed, provides that children between 16 and 18 years, who are working, must attend continuation school four hours per week, but if not working, they must attend full time. The law owes its inception to the fact that a great many pupils dropped out of school as soon as they became 16, attending only four hours a week.

OFFSET FUNNEL

Alfred Grayshon, Olney High School, Philadelphia, Pennsylvania

The accompanying illustration shows a funnel that is very handy for filling the crankcase of an automobile. The funnel is made of tinplate.

While the average boy in the school metal shop will be able to construct it, there are some who may have difficulty with the development of the body. In that case the instructor should allow such students to use a template, but a student should be impressed with the value of knowing how to develop the jobs which he does in the shop.

Method of Procedure

Body

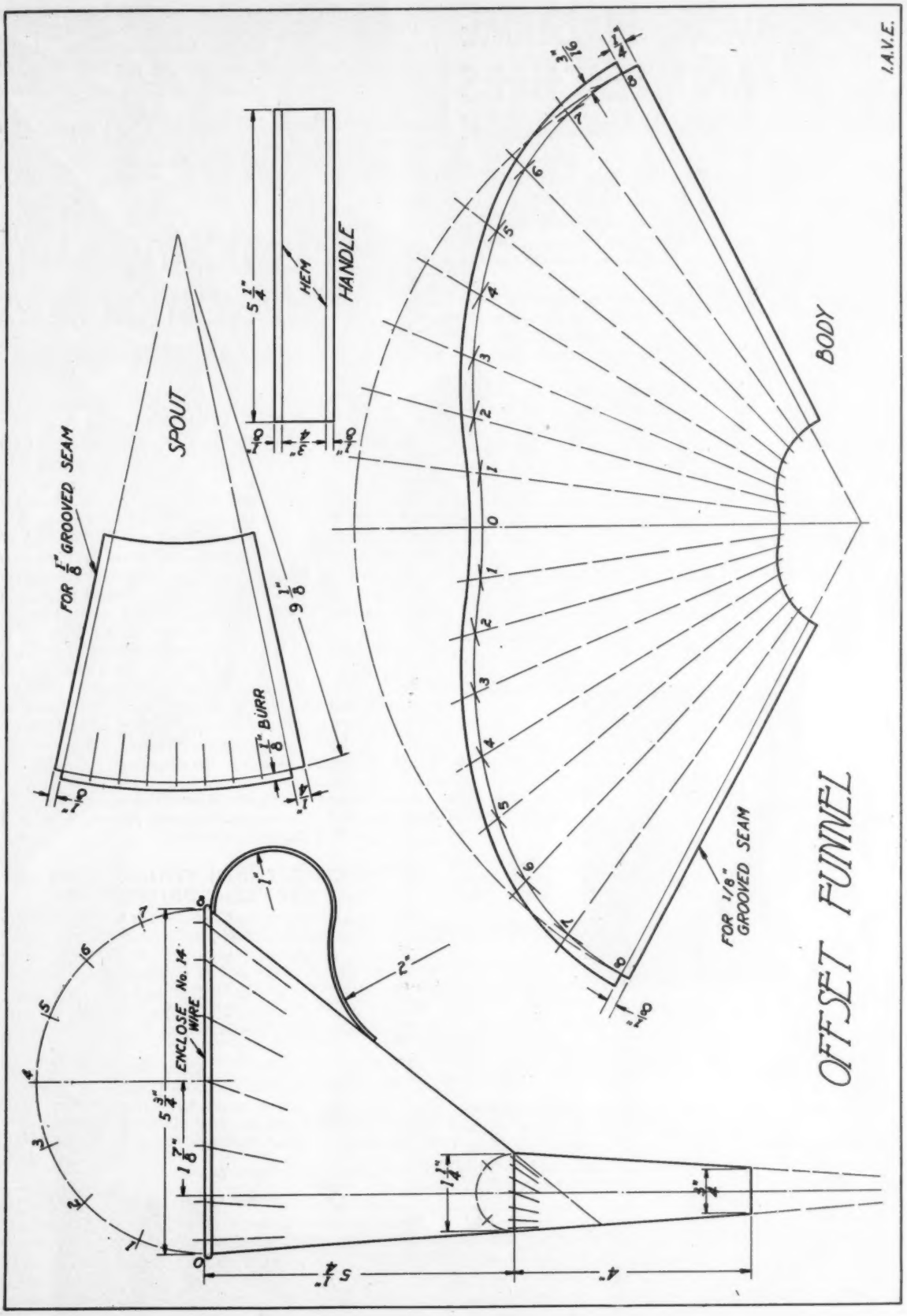
1. Develop the body by the method shown.
2. Cut out on the outline.
3. Bend 1/8-in. single folds in opposite directions on the straight edges.
4. Form the body.
5. Hook the two single folds together and groove seam.
6. Turn a 3/16-in. edge at the top for receiving the wire.
7. Cut enough wire for the circumference and bend into a circle.
8. Place this wire in the turned edge so as to overlap the seam and close the edge over the wire.
9. Solder the grooved seam inside.

Spout

1. Develop the spout. 2. Cut out and shape.
3. Solder the lap seam.
4. Burr out the upper edge with a cross-peen hammer.
5. Place in position on the small end of the body and solder.

Handle

1. Lay out.
2. Cut out.
3. Hem the edge and shape.
4. Solder to the body over the seam.


I.A.V.E.
SPOUT
HANDLE
HEM
BODY
FOR 1/8" GROOVED SEAM
1/8" BURR
FOR 1/8" GROOVED SEAM
ENCLOSE No. 14 WIRE
OFFSET FUNNEL

AMONG INDUSTRIAL-ARTS TEACHERS

VOCATIONAL EDUCATORS OF NEW JERSEY HONOR MR. O'LEARY

Mr. Wesley O'Leary, Assistant Commissioner of Education in New Jersey, was especially honored on Wednesday evening, June 8, at a testimonial dinner given in the Elizabeth Carteret Hotel, at Elizabeth.

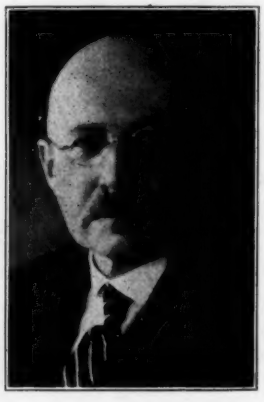
The dinner was given by his coworkers in the field of vocational education in New Jersey, in recognition of his election as president of the American Vocational Association and the receipt of the honorary degree of Doctor of Science conferred upon him by Stout Institute.

The guests and speakers at the dinner included Dr. Charles H. Elliott, Commissioner of Education, Dr. J. C. Wright, chief of the Federal Board for Vocational Education in Washington, Dr. E. B. Kent, director of vocational education in Jersey City, and Mr. B. H. Thomas, instructor in vocational education at Oklahoma City.

Mr. O'Leary received a number of telegrams and messages of congratulation from friends and coworkers in the field throughout the country.

JAMES C. CLARKE RETIRES

Mr. James C. Clarke, special coördinator for the coöperative industrial department of the Hyde Park High School, Boston, retired at the close of the last school year, after a service of 34 years in the Boston schools.



JAMES C. CLARKE

Mr. Clarke was graduated from Lawrence Academy in 1882, after which he served an apprenticeship in the machinist's trade.

He began his teaching career in 1896 with his appointment as instructor in mechanical drawing and woodwork at the Massachusetts Reformatory in Concord. Later he entered the Sloyd Training School from which he was graduated. He then entered the Boston school system as an instructor in manual training.

In 1912 he started the coöperative classes in industrial education in the Hyde Park High School and was largely responsible for the growth and development of the movement.

Mr. Clarke was one of the seven charter members of the Boston Manual Training Club, founded in 1898, and which has now become the Vocational Education Society of Boston.

¶ Mr. W. W. Pennington, 32, manual-training instructor at Deer Lodge, Mont., died at Rochester, Minn., on June 25, following an operation. Mr. Pennington went to Deer Lodge from Phillipsburg a year ago, where he had been connected with the Granite county high school as manual-training teacher.

¶ Mr. Paul Erdman, of Salt Lake City, Utah, has been employed as manual-training instructor at Greenfield, Iowa.

¶ Mr. Edward M. McDonough, has been appointed principal of the Boston Trades School to succeed Wm. C. Crawford.

ASSOCIATION AND CONVENTION NEWS

PEORIA INDUSTRIAL EDUCATION CLUB HOLDS MEETING

The last dinner meeting of the Peoria Industrial Education Club was held on Monday, May 9, at the Thompson Inn, Pekin, Ill.

Following the dinner, the thirty members retired to the Pekin High School for the program of the evening. Mr. Charles Bennett, of the Manual Arts Press, told the club of some of the meetings he had attended at the Western Arts Meeting in Saint Louis the week previous. Mr. Bennett explained the two methods of teaching mechanical drawing in the high school which had caused comment at the meeting. Dean A. F. Siepert, of Bradley Institute, made a brief report on the Western Arts Meeting at Saint Louis, speaking on Dr. Slutz's address on "The Unliked Teacher." Both speakers told of the Saint Louis Vocational School, mentioning its plant, its equipment, and some of the problems which it is facing at the present time. Mr. Floyd Lee, of the Pekin High School, gave a talk, dealing with a trip to several cities of continental Europe, in which he mentioned the customs of the people and the church architecture.

At the business session, Mr. Harry Clark was elected president, Mr. G. T. Danner secretary, and Mr. W. P. Crowell treasurer. — *F. L. Barloga.*

CONNECTICUT INDUSTRIAL ASSOCIATION MEETS AT BRIDGEPORT

The annual meeting of the Connecticut Industrial and Practical Arts Association was held May 11, in the Bassick Junior High School, Bridgeport, Conn. Dr. E. E. Cortright, of the Bridgeport Junior College, was the principal speaker. He took for his subject, "The Rise and Fall of the Bachelor's Degree."

At the regular fall meeting, it is planned to invite Dr. Ernest W. Butterfield, State Commissioner of Education, to give a talk.

At the business session, Mr. Arthur Feuerstein, of Stamford, was elected president, to succeed Mr. F. E. Whitman. The other officers elected were: Mr. Kenneth Allen, Stamford, vice-president, and Mr. Fred Martin, Bridgeport, secretary-treasurer. — *Arthur Feuerstein.*

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VOCATIONAL GUIDANCE

A grammar-school guidance committee has been formed under the direction of L. N. McWhorter, to provide vocational-counseling service to the seventh- and eighth-grade pupils of Minneapolis. The plan aims to assist pupils in understanding high-school courses and in providing information on vocational opportunities and training.

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Fig. 732

"HALLOWELL" Work-Bench of Steel.

Made of hard, smooth steel throughout. Excellent metal-working Bench. Vise not shown. Drawer is extra. Fireproof. Finished in Olive green. Shipped from stock.

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Fig. 924

"HALLOWELL" Steel Work-Bench.

Laminated Hard-wood plank in front. Very popular with Die and Tool makers. Vise not shown. Drawer is extra. Finished in Olive green. Shipped from stock.

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Fig. 928

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ANNOUNCE NEW ELECTRICAL DRILL

The United States Electrical Tool Company, 2490 West Sixth St., Cincinnati, Ohio, has announced a new electrical drill which is an addition to their line of electrically driven drills, grinders, buffers, and polishers.

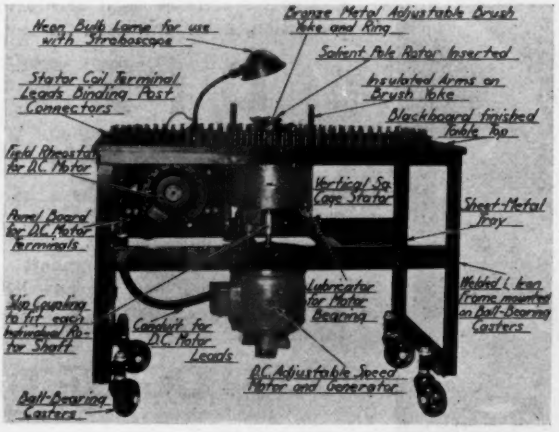
The new drill is known as the ¼-in. Midget drill and has been especially designed for light-duty work where close-quarter operations are necessary. The body is of aluminum, the gears are of the double-reduction type, and the entire tool is adaptable to a wide range of purposes.

Complete information and prices may be obtained upon request.

THE NEW EXPERIMOTOR

The Milwaukee Imperial Electric Company, Milwaukee, Wis., announces a new improved Experimotor which will help the teacher of electricity in translating d.c. and a.c. motor and generator theory into actual motor and generator practice.

A squirrel-cage stator with three interchangeable rotors, a d.c. adjustable-speed (1,000 to 2,000 r.p.m.) motor with slip coupling which fits the interchangeable rotors, form the essentials of this unique piece of laboratory equipment. The whole apparatus is mounted on a stanch iron frame equipped with ball-bearing casters.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ADVERTISING PAGES REMOVED

NEWS — NOTES

VOCATIONAL PRIZES AWARDED TO TEACHERS

The vocational-education department of the University of Toledo has announced the prize awards for the best contributions in the field of vocational education for the 1931–32 school year.

The first prize of $75 was divided between Mr. L. L. Smart, instructor in aviation mechanics, and Mr. J. C. Eddie, instructor in auto mechanics, in the Toledo Vocational School, Toledo, Ohio. The subject of Mr. Smart's contribution was "Analysis and Related-Subject Course Outlines for Airplane Mechanics," and Mr. Eddie's subject was "Analysis and Shop-Course Outline for Auto Mechanics."

The second prize of $25 was given to Mr. J. H. Lawrence and Mr. K. K. Porter of the Findlay Vocational School, Findlay, Ohio. Their contribution was entitled "Related-Subject Course Outlines in Mathematics for Auto Mechanics, Related Science and Materials, and Theory and Construction for Auto Mechanics."

The prizes were offered by the Ohio State Board for Vocational Education, Division of Trades and Industries, coöperating with the vocational department of the University of Toledo, for the most worthy contributions in the field of vocational education in northwestern Ohio during the year.

The judges in the contest were Mr. E. L. Heusch, supervisor of trades and industries for the division of the State Board of Vocational Education, Mr. David W. Henry, dean of the College of Education of the University of Toledo, and Mr. H. W. Paine, vocational teacher trainer of the department of vocational education, University of Toledo.

Stout Institute Summer Session

The Stout Institute summer session was held for a period of six weeks, beginning with Monday, June 20, and attracted an attendance of 433 students, including 137 women and 296 men. Long-distance registrations include some from Pennsylvania, Texas, California, and Canada.

The special speaker and conference list included the following: Mr. Charles Morgan, who presented the modern trend in architecture; Prof. Homer J. Smith, of the University of Minnesota, who talked on "Some Career Considerations"; Dr. Jennie M. Turner, of the State Board of Vocational Education, Madison, Wis., who touched on the pertinent phases of social science as they affect the teaching responsibilities of home economics and industrial teachers; Mr. Henry Ohl, Jr., who conducted conferences on education and labor in the present emergency; and Mr. George P. Hambrecht, who talked on the outstanding present trends in vocational education.

Miss Marcia Turner, of Iowa State College, Ames, Iowa, conducted a unit in home-economics work for teachers in secondary schools, and Miss Merle Ford, of Baltimore, Md., demonstrated the teaching of home economics to boys in secondary schools.

Winners Announced in Fir-Plywood Prize Contest

The Douglas Fir Plywood Manufacturers, Seattle, Wash., have announced the twelve winning designs in the fir-plywood prize contest. The designs suggested a variety of uses ranging from display racks to false fireplaces and were chosen on the basis of the novelty and utility of each idea. The prizes amounted to $300 in cash.

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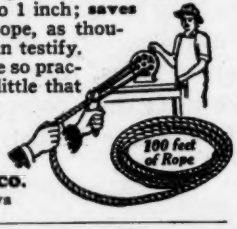

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